

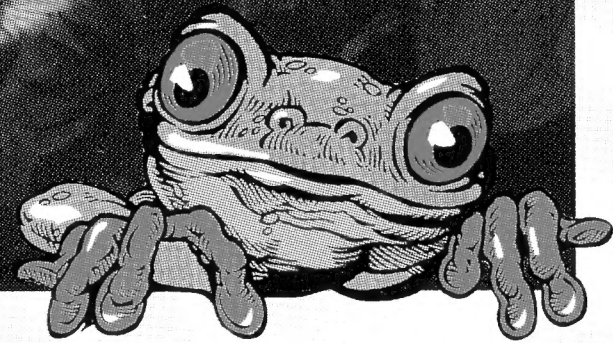
MAY/JUNE 2001

Zoogoer

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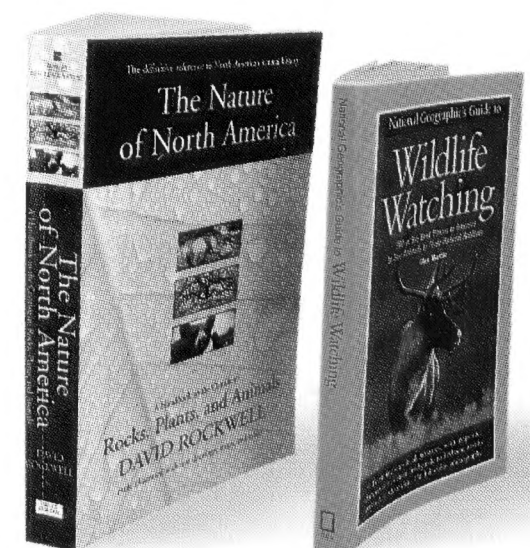
From hatching hummingbirds to monkeying macaques and partying pandas, catch up on the latest Zoo news lest you snooze.

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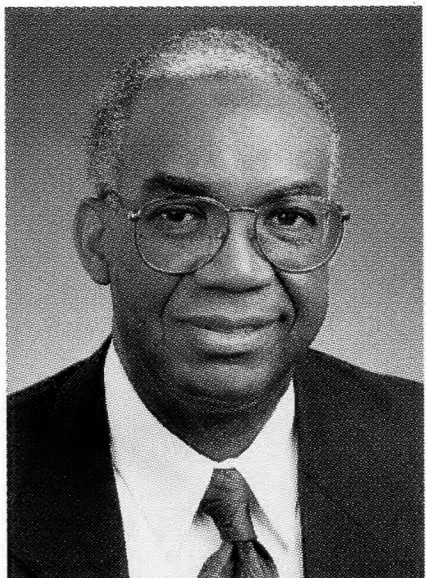
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Baldies in the Old Line State, monarchs in Mexico, magic cows in Vietnam, and Poe 'n Bawl'mer.



CALL TO NOMINATIONS

In accordance with our Bylaws, the Friends of the National Zoo Board of Directors is now soliciting nominations from the membership. Our volunteer Board plays an essential role in FONZ leadership and operation, and we rely on our members to recommend people with appropriate skills and talents to assist our efforts to support the Smithsonian's National Zoo.



I ask you to help by nominating to the Board persons who are interested in this very special community service. You may also nominate yourself. Nominations will be reviewed by the Board's Nominating Committee. The names of selected candidates will be forwarded to the membership for election. The criteria by which potential candidates are judged for nomination to the Board of Directors include: the candidate's strong interest in supporting zoological education, research, and conservation in accordance with the purposes of our corporation; leadership; experience or skills that are needed and that would directly benefit FONZ management and operations; and the willingness to commit significant amounts of time to participate fully in FONZ work and activities. Candidates must also be dues-paying members of FONZ.

Much of the Board's work is accomplished through committees. For example: The Education and Technology Committee makes policies and provides guidance for FONZ-supported education, conservation, outreach, and Zoo-supported programs. The Membership and Development Committee develops policies related to membership activities and provides oversight for membership acquisition and retention programs and fundraising for the Zoo. The Guest Services/Concessions Committee formulates policies for FONZ concessions operations and visitor support services. Other Board committees include: Administration, Finance and Audit, and Nominating.

All Board members are expected to serve on at least two committees and may be asked to attend one or more meetings or functions each month. Nominations may be made only by dues-paying members and must be submitted on an official FONZ Nomination Form with a biographical sketch of the nominee. Call 202.673.4951 to receive Nomination Forms or to discuss Board services with me or a member of the Board. The deadline for submitting nominations is July 24, 2001.

Sincerely,

Clinton A. Fields
Executive Director

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Friends of the National Zoo wishes to thank the following sponsors for their generous support of Panda Extravaganza: National ZooFari 2001. Your patronage of these businesses may encourage their future support of FONZ.



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is a nonprofit organization of individuals, families, and organizations who are interested in helping to maintain the status of the Smithsonian's National Zoological Park as one of the world's great

zoos, to foster its use for education, research, and recreation, to increase and improve its facilities and collections, and to advance the welfare of its animals.

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Smithsonian **National Zoological Park** is located at 3001 Connecticut Ave., N.W., Washington, DC 20008-2537. Weather permitting, the Zoo is open every day except December 25. Hours: From May 1 to September 15, grounds are open from 6 a.m. to 8 p.m.; buildings, 10 a.m. to 6 p.m. From September 16 to April 30, grounds are open from 6 a.m. to 6 p.m.; buildings, 10 a.m. to 4:30 p.m.

Membership in FONZ offers many benefits: publications, discounts on shopping, programs, and events, free parking, and invitations to special programs and activities to make zoo-going more enjoyable and educational. To join, write FONZ Membership, National Zoological Park, Washington, DC 20008, call 202.673.4961 or go to www.fonz.org.

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NOTES NEWS

ANIMAL NEWS

For two tiny hummingbird chicks, it was time to get cracking. The Smithsonian National Zoo's female Costa's hummingbird (*Calypte costae*) laid two white eggs, each the size of a pinto bean, on February 10 and February 12. Her two chicks braved the new world outside their eggs on February 26, following the standard two-week incubation. These chicks

are their mother's first offspring; the Zoo now boasts a Costa's family foursome.

Costa's hummingbirds use spider webbing to hold a new nest in place and to bind nesting materials together. The female shapes the nest by pressing her breast along the outside and pressing down on the interior nest floor



COSTA'S HUMMINGBIRD MOTHER (TOP) WITH HER TWO CHICKS (BELOW, RIGHT).

with her feet. She decorates the outside with bits of lichen, leaf litter, seeds, or other appropriately colored material for camouflage. The mother continues to decorate and expand the nest as the chicks grow.

Costa's hummingbirds reside in the arid southwestern United States and Mexico, where they seem to prefer the nectar of red flowers. Hummingbirds and many insects are pivotal in the reproduction of a wide variety of plants, carrying pollen from one flower to the next as they sip nectar (see "One Shutterbug's Love for the Birds and



the Bees" in the July/August 2000 *ZooGoer*). Be sure to buzz by Pollinarium in the Zoo's Invertebrate Exhibit to see these colorful creatures.

More twins have arrived in our Zoo family! At the National Zoo's Conservation and Research Center in Front Royal, Virginia, a maned wolf (*Chrysocyon brachyurus*) mom gave birth to two pups on January 23. These were the first maned wolf pups born at the center since 1992. Nicknamed stilt-legged foxes on account of their disproportionately sized limbs, maned wolves' long legs help these canids to see over tall grasses in their natural habitat in the savannas of northern Argentina, Paraguay, eastern Bolivia, and southeastern Peru. With only about 2,200 to 4,500 individuals left in the wild, the maned wolf is considered vulnerable by the World Conservation Union on account of habitat loss as well as hunting.

The Zoo's Think Tank is celebrating its first primate birth. A baby Sulawesi macaque



THE BABY SULAWESI MACAQUE, RIPLEY.

(*Macaca nigra*) named Ripley was born to mother Raya there last December 26, and the precocious toddler has since been greeting the public with raised brows, flattened ears, and lip smacking. Native to the Indonesian island of Sulawesi, these macaques in the wild give birth to one offspring after a five-and-a-half month gestation period. Stop by Think Tank if you have some time to monkey around.

Up the Olmsted Walk hill, the giraffe Jana, born January 18, has been doing very well according to keepers at the Elephant House. She was standing six and a half feet tall as of the middle of March and has begun eating solid foods such as concentrated pellets (comparable to dog biscuits) and bamboo with her mother, Griff. However, Jana will also continue to nurse from her mother until October.



MEI XIANG (LEFT) AND TIAN TIAN ARE THE HONORED GUESTS AT ZOOFARI: PANDA EXTRAVAGANZA.

PARTYING WITH PANDAS

Panda Extravaganza is the theme for **National ZooFari 2001**, FONZ's fabulous annual gala benefit that will offer gourmet fare from more than 100 of the Washington area's premier restaurants, including Galileo da Roberto Donna, Kinkead's, Vidalia, Osteria Goldoni, and The Willard Room: Willard Inter-Continental Hotel. A spring tradition in Washington second only to the cherry blossoms, ZooFari takes place this year on

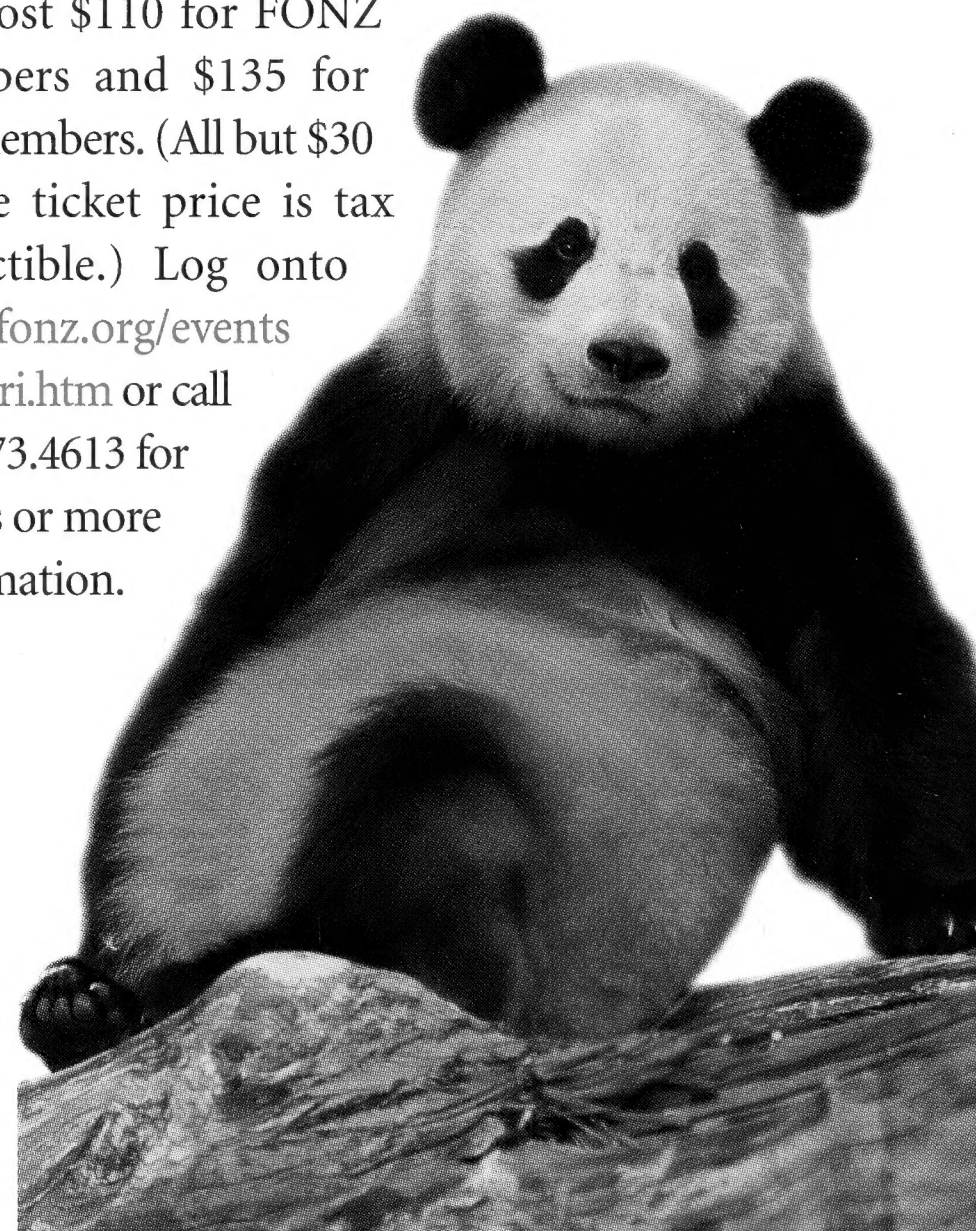
Thursday, May 17, from 6:30 p.m. to 11 p.m. Last year's edition attracted nearly 4,000 people.

ZooFari 2001 will feature live entertainment from R&B legend Gene Chandler—best known for his 1962 smash hit, "Duke of Earl"—as well as a big-band cabaret, The Jack Diamond Trio, The Johnny Artis Band, The Trux Baldwin Orchestra, DaVinci's Notebook, and other musical groups. Animal demonstrations, a sweepstakes and silent auction, and wine from 20 of the country's finest vintners all will delight attendees.

The Panda Extravaganza theme highlights the historic arrival of giant pandas Mei Xiang and Tian Tian at the National Zoo, as well as the conservation threats to endangered wild giant pandas in their native habitat in the bamboo forests of central China. Proceeds from National ZooFari this year will be earmarked for FONZ's Giant Panda Conservation Fund. Last year's event raised more than \$375,000, a portion of which

went toward the acquisition of Mei and Tian.

Beginning May 1, tickets will cost \$110 for FONZ members and \$135 for nonmembers. (All but \$30 of the ticket price is tax deductible.) Log onto www.fonz.org/events/zoofari.htm or call 202.673.4613 for tickets or more information.



THE MALE GIANT PANDA TIAN TIAN.

FUN IN THE SUN

Want to know where you can go for a quality '80s rock dance party while chilling with two cool bears? The National Zoo, of course. The next Young Professionals Event, **They Might Be Giant Pandas**, will take place June 14, from 6 to 9 p.m. But you can leave your Cindy Lauper cassettes at home because DJ Steve Bates will entertain, and the cash bar will quench. Tickets are \$8 prepaid or \$10 at the door.

FONZ's Young Professionals program is geared to young adults—and the young at heart—who want to spice up life outside of the office. FONZ offers adult classes, interna-

tional travel opportunities, after-hours social events, and lots of chances to meet and mingle with other fun, environmentally aware adults. And participation in FONZ programs helps support the conservation, education, research, and recreation projects of the Smithsonian's National Zoo. For more information or to purchase tickets, go to www.fonz.org/getinv/yp.htm or call 202.673.4962.

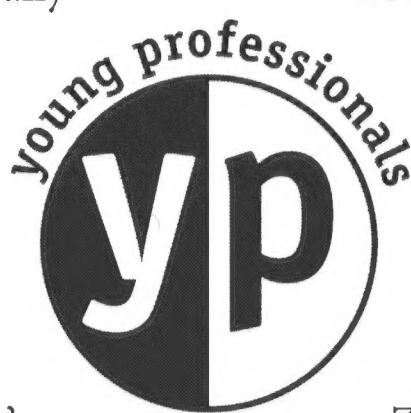
There's nothing quite like an outdoor concert in the summer, especially if it's at the National

Zoo. We invite you to attend **Sunset Serenades**, which begin a week after the summer solstice. Couples, families, and individuals can celebrate the warmth of summer and the sound of music while relaxing on the grassy slope of Lion/Tiger Hill. From June 28 to August 2, the Zoo will present a music group every Thursday evening from 6:30 to 8 p.m. And it's all free! Acts include the 257th Army National Guard Band on July 12 and the Air Force Silver Wings on July 19. For an updated performance schedule and more information, go to

www.fonz.org/events/sunset_serenades.htm or call 202.673.4663.

ZooNight is another great reason to be glad that you're a Friend of the National Zoo. The annual event includes special animal demos, keeper talks, hands-on activities, performances, crafts, and games—and the whole Zoo is open only to FONZ members. ZooNight will take place 5:30 to 8:30 p.m. on Saturday, June 9, for members with last names beginning A-L, and Friday, June 22, for last names M-Z. Look for more information in the next issue of *Wildlife Adventures*.

—Matthew Huy



BY JOHN TIDWELL

STURGEON FISHES

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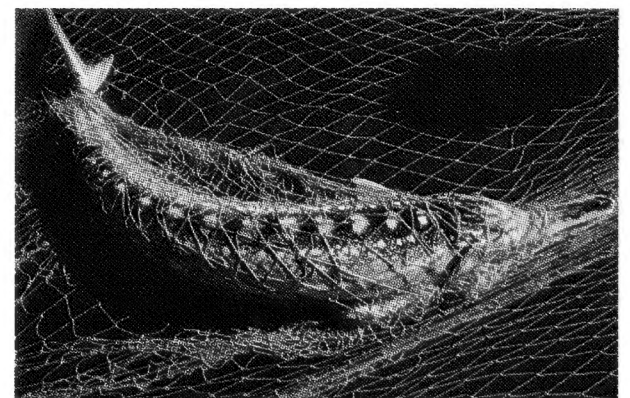
CAVIA





A beluga sturgeon swims slowly through the murky water of the Caspian Sea, her scaleless, golden brown body bristling with bony plates reminiscent of sea monsters. She is enormous: ten feet long and 2,000 pounds. Hidden deep inside she carries a treasure, something for which people will pay thousands of dollars, risk their lives, and even murder: millions of tiny gray eggs called caviar.

R DREAMS



It is springtime. As the massive fish noses about the sea floor for crabs, she senses a current of fresh water flowing from Russia's Sulak River and instinctively heads toward it. For tens of millions of years, beluga sturgeon (*Huso huso*) have spawned in the tributaries of Central Asia's Caspian Sea, seeking out, like salmon, the river in which they hatched. Other female sturgeons—belugas as well as stocky osetra (*Acipenser gueldenstadtii*) and smaller, thin-snouted sevruga (*A. stellatus*)—join the great female as

she heads upriver, moving in massive herds toward the spawning grounds. But the old female doesn't detect a ghostly line of nylon netting wafting in the current like grass—until it catches around her head and hooks behind her gills.

In the dark two men in a small skiff haul in their nets. Unemployed local truck drivers, the poachers quickly bring the thrashing female beluga close to the boat and stun her with a heavy wooden club. They haul her ashore and open her belly, scooping out the precious caviar while she

is still alive. Other fishermen are also collecting caviar from sturgeons they've captured. Then a local businessman, who has claimed several miles of Dagestan's coastline as his territory, arrives with a few large trucks. The poachers sell him the fish and the precious roe for about \$5 each and load up his trucks. In addition to the cash, the owner protects the men from having to pay bribes of up to two thirds of their catch to local officials who are supposed to make sure all sturgeon catches are legal.

The owner's trucks then take the night's catch to a nearby camp where the fish are crudely processed. Sturgeon eggs are washed, sieved, and lightly salted—what Russians call *malossol*—to preserve them. Smaller illegal caviar dealers would then put the eggs into three-liter jars to be trucked to Moscow, perhaps hidden under sacks of potatoes. But this is a larger operation, so the caviar is vacuum-packed, bar-coded, and labeled in English, ready for sale in the gourmet emporiums of New York and Washington, D.C. It is then smuggled out from Astrakhan, where the bulk of Russia's caviar business—legal and illegal—originates, or it goes south through Azerbaijan to

the Caspian region, the situation has become so dire that governments around the world may vote to ban the international trade of Russia's three most famous caviar sturgeons—beluga, sevruga, and osetra—bringing a multimillion dollar global industry to a halt.

Black Gold

Caviar has been synonymous with luxury cuisine for thousands of years. Aristotle described great platters of caviar garnished with flowers, served amid trumpet fanfare at the end of Greek banquets. Persians ascribed curative powers to sturgeon eggs and called them *chav-jar* ("cake of power"), hence the word caviar. England's 12th-century King Edward II declared sturgeon a "Royal Fish"; any sturgeon caught in British territory had to be offered to him. For early American colonists, sturgeon meat and caviar were the New World's greatest cash crop until they discovered tobacco. Writers from Shakespeare to Dostoyevsky rhapsodized about, and indulged in, the precious roe some call "black gold."

But sturgeon and their eggs have held a special, almost mystical place in the Russian soul since as long ago as the 8th century B.C., when the Scythians ruled southern Russia. Moscow's infamous tsar Ivan the

Terrible seized the Northern Caspian region from Muslim Tatars in the 16th century and began a tradition of extracting regular caviar tribute from conquered territories of the Azov, Black, and Aral seas as well. But it wasn't until 1860 that Caspian caviar appeared in Western Europe, where its introduction as the food of the tsars made it a symbol of wealth and opulence. Caviar quickly became one of Russia's most renowned exports. Its new cachet, however, spelled the beginning of the end of the great sturgeon schools, as caviar formed the

basis of a lucrative industry in Europe and North America. Sturgeon populations everywhere were quickly overfished. What no one knew was that because sturgeon take so long to mature—from six to 25 years—wholesale netting of adult females (and their eggs) was biologically catastrophic to the fishery.

"It was more like mining than fishing," explains Vadim Birstein, an independent Russian biologist who has been at the forefront of efforts to save Caspian sturgeon. "By 1910, sturgeon populations around the world were so depleted that they were nearly gone."

In Russia the caviar industry had been a state monopoly since Peter the Great in the 17th century, but by the early 1900s most of the enterprise was in private hands. After the Bolshevik Revolution, the Soviet state took control of the sturgeon fishery, centered almost entirely in the old Tatar city of Astrakhan near the northern end of the Caspian Sea. However, sturgeon catches continued to fall, partly because Stalin's government was building hydroelectric power dams on many Russian rivers, effectively closing off 85 percent of the sturgeon's upriver spawning grounds. Some areas of the Volga Delta, which supplies the majority of water to the Caspian Sea, actually became dry. During the 1960s, Caspian fishing remained a major industry, shared by the Soviets in the north and Iran in the southern portion of the sea. But to keep sturgeon populations going, the powerful Soviet Ministry of Fisheries had to create scores of artificial sturgeon hatcheries along the Volga, Ural, Kura, and other Caspian tributaries. There, eggs from gravid females were mixed in tanks with sperm to be fertilized. The resulting fry were then released into the Caspian to grow and mature. Tens of millions of fry have been freed each year



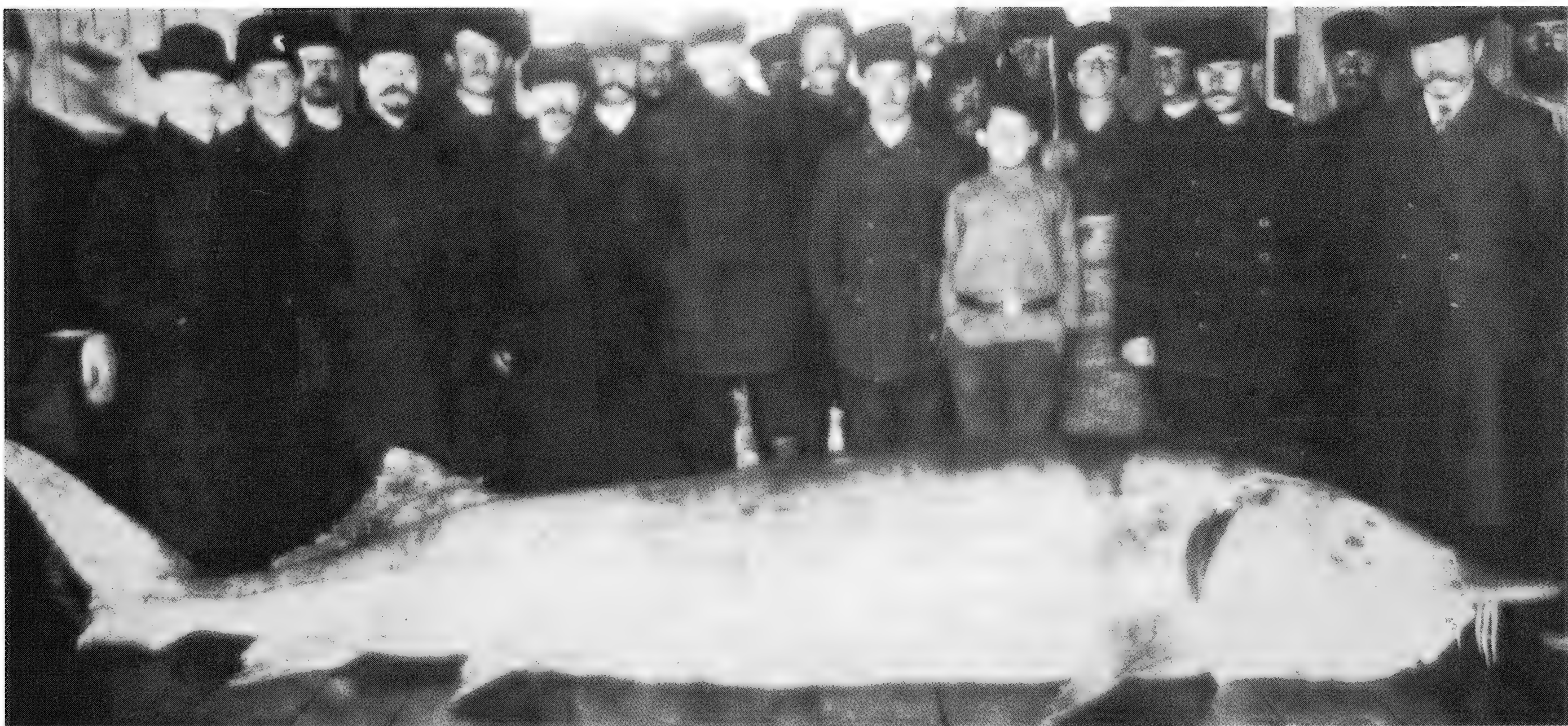
POACHERS HAUL IN A KALUGA STURGEON (*HUSO DAURICUS*) FROM THE AMUR RIVER DELTA.

Turkey and to Dubai in the United Arab Emirates, two important gateways to Western trade.

According to TRAFFIC, the world's largest wildlife trade monitoring program, scenarios like this fictional one have been repeated hundreds of times since the early 1990s, as the impoverished people living along the Caspian Sea legally and illegally catch the last of these giant, ancient fish. The beluga sturgeon (*Huso huso*) is one of the largest freshwater fish on Earth and among the oldest living vertebrates, first appearing some 250 million years ago. Beluga is one of 27 known species of sturgeon found in the Northern Hemisphere, all of which are now either threatened or endangered. In fact, experts fear that numbers of the six species of Caspian sturgeon are falling so fast that their populations could be driven to the edge of extinction. With a ravenous multimillion dollar international trade in caviar and a lawless atmosphere throughout most of

WORKERS SIEVE BELUGA ROE TO SEPARATE EGGS FROM THE COVERING MEMBRANE.





INTERNATIONAL SOCIETY OF CRYPTOZOOLOGY

GIANT BELUGA STURGEONS (*HUSO HUSO*) ARE FAR LESS FREQUENTLY ENCOUNTERED THAN A CENTURY AGO.

since the late 1950s, and today many biologists believe that most of the sea's sturgeon were spawned in hatcheries.

In the early 1970s the Soviet Ministry of Fisheries took other unilateral conservation measures: They banned trawling in the open

Caspian with large, bottom-scraping nets (which destroy sturgeons' sea-floor food sources) and restricted sturgeon fishing to spring and autumn with rigid catch limits. The Ministry of Fisheries' tactics may have been iron-fisted, but they allowed sturgeon stocks to rebound



AN OFFICIALLY SANCTIONED CASPIAN STURGEON CATCH.

and kept bootleg caviar to a minimum. Seven huge floating fish factories were launched in the Caspian to churn out Russian caviar and smoked sturgeon meat.

The Caviar Mafia

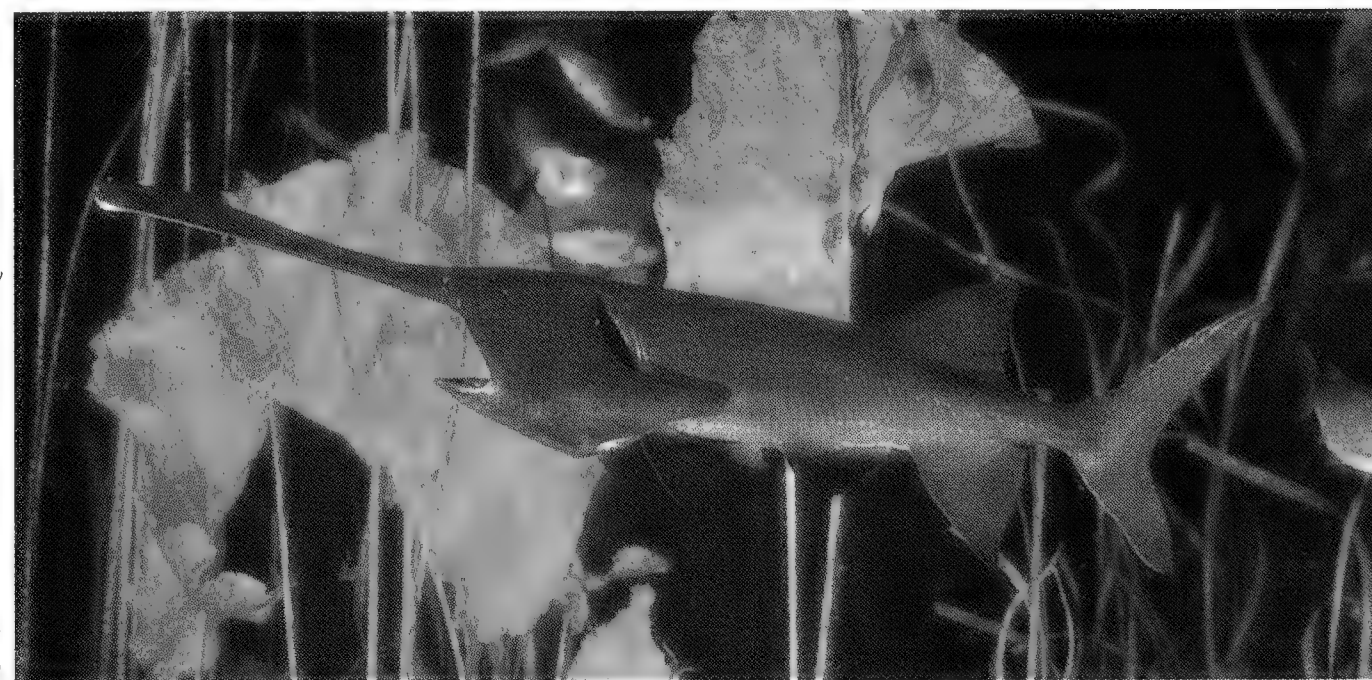
Everything changed when the Soviet government collapsed in 1991, and the USSR shattered into 15 pieces. Three Soviet provinces that once

supplied sturgeon products suddenly became the independent nations of Kazakhstan, Turkmenistan, and Azerbaijan. Even territories that officially remained part of Russia, like Chechnya and Dagestan, claimed autonomy. The collapse of the Soviet regime also brought widespread unemployment and poverty to the breakaway republics. Factories closed and once plentiful resources suddenly had to be shared by an array of foreign countries.

The leaders of Kazakhstan, Turkmenistan, and Azerbaijan—themselves former Communist chiefs—began to behave like feudal monarchs. Prior treaties, including those governing the shared monopoly on sturgeon fishing between the USSR and Iran, were now void. The Caspian, previously the nearly exclusive sturgeon preserve of the Soviet Ministry of Fisheries, became divided among all the of nations touching the sea, each wanting to control part of the fishery. Kazakhstan, for instance, claims any sturgeon that swim by its shores. With Russian caviar selling for as much as \$1,000 a pound in Western countries, today all of the littoral states are trying to catch as many sturgeon as possible.

“Under the USSR everything was centralized and controlled,” says Willem Wijinstekers, Secretary General of the UN's Convention on the International Trade in Endangered Species of Fauna and Flora (CITES). “Maybe sturgeon were somewhat over-exploited, but nothing like the uncontrolled fishing we have now. It's just chaos.”

Only Iran's government-run *Shilat* fishery organization and the Russian Federation's re-named State Committee for Fisheries, which remains nearly identical to the old Ministry, have organized fishery management programs. An estimated 90 percent of the world's caviar comes from the Caspian Sea, and more than 70 percent of that is from Russia. In Astrakhan, 12 teams of federally licensed sturgeon fishermen squat in small tents called *tonyas* on the Volga Delta, setting their nets each day exactly as they did during Soviet times. They are monitored by the Fish Guards, special squads of local police working for the Committee for Fisheries, with the power to arrest or make commando raids on regional poaching gangs, who are known as “The



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ROE FROM DECLINING POPULATIONS OF PADDLEFISH (*POLYODON SPATHULA*) MAY BE FRAUDULENTLY MIXED WITH EGGS FROM ITS STURGEON RELATIVES.

Caviar Mafia.” But by the mid-1990s it had become clear that the Fish Guard were no match for organized crime.

“The Mafia have got boats that are five times faster than the government inspector's boats,” explains Wijinstekers. “They've got bigger guns



than the inspectors have ever seen in their lives, so they don't dare to stop a boat. And if inspectors do catch them, the poachers just pay them off."

In 1993, then Russian president Boris Yeltsin assigned military troops from several different

government agencies to protect not only the Fish Guards, but also federal sturgeon hatcheries and fishing grounds. However, in Russia, having more militia around doesn't necessarily help.

"There are six different military structures supposedly guarding the official fishing in the Volga River," Birstein says. "Border guards, local police, local militia all standing around with Kalashnikovs while these guys fish. But they are



really like six different gangs. When the fisherman catches a fish, guess who he has to give it to? The guys with the guns."

With cash scarce, ordinary villagers in the former Soviet Republics are left to fend for themselves. Many turn to the Caspian for food and trade, doing what they have done for centuries: surviving. Chronically underpaid Fish Guards

Most of us can forego imported caviar without much trouble. At \$35 to \$100 per ounce (equal to about 74 calories), no one is likely to get a significant chunk of his or her daily dietary needs filled by these fish eggs. Unfortunately, however, many of the fish and shellfish we eat regularly in North America are in varying degrees of danger, even as our consumption of fish is growing rapidly. In fact, Environmental Defense estimates that 70 percent of all commercially important fish are at or beyond the point at which fishing is not sustainable.

Among the best known is cod, once so common that they could be scooped out of the ocean in buckets. This most important food fish has been thoroughly overfished and mismanaged in the North Atlantic for many years. By 1992, the Canadian government imposed a moratorium on cod fishing in its maritime provinces, including on the Grand Banks off Newfoundland—once the most productive fishery in the world. A limited harvest was allowed beginning in 1997, but cod numbers still show no signs of recovery. Recently, the European Union reduced the year 2002 cod quota by 40 percent due to concern about overfishing in the North Sea, with a potentially devastating impact on Britain's fish and chips market. Some scientists fear that cod might never recover; this species is among the few marine fish on the World Conservation Union's Red Data List.

Swordfish is another species of concern. According to the Natural Resources Defense Council (NRDC) and SeaWeb, the average swordfish caught today in the North Atlantic weighs

90 pounds, only one-third the weight of swordfish caught in the 1960s. This is significant because many of these smaller fish haven't reached breeding age. Moreover, many young swordfish are caught in longlines—immense nets up to 80 miles long that sweep up everything in their paths—and then dumped because they are too small to harvest legally.

In 1998, NRDC and SeaWeb launched the Give Swordfish a Break campaign. At the urging of conservationists, 27 prominent chefs, including Washington, D.C.'s doyenne of organic

cuisine, Nora Puillion, swore off serving swordfish. As the campaign progressed, this number grew to more than 700 chefs, as well as groceries, hotels, and other food purveyors. The campaign also lobbied for an international agreement to reduce the catch, which came in 1999, and new federal regulations, which came in August 2000. The U.S.'s seasonal closure of longline fishing in about

133,000 square miles of the Atlantic is expected to reduce the number of juvenile swordfish caught and killed

by between 31 and 42 percent and thus give the fishery time to recover. The success of the campaign ended the formal boycott of swordfish, although conservation groups still recommend that chefs and consumers avoid this species.

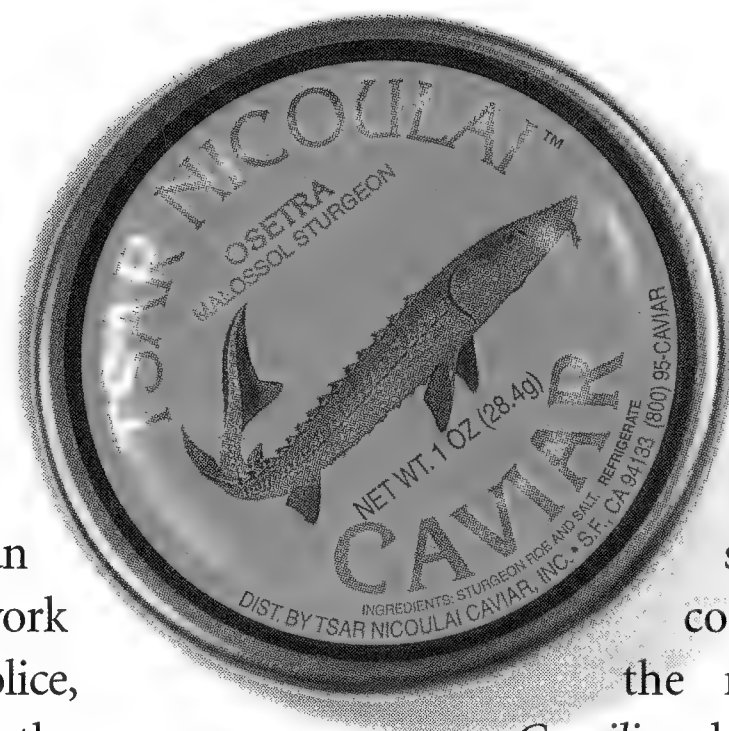
Salmon also raises contentious issues. Most people would assume that farmed salmon is a better choice than wild salmon. In fact, it's not. Conservation groups recommend wild Alaska salmon as the environmentally correct option because



SNAGGED ON A POACHER'S LINE, A STURGEON IS EMPTIED OF ITS BLACK GOLD.

FISH FOOD

SUSAN LUMPKIN



and local militia also turn to bribes and smuggling to make ends meet.

But according to TRAFFIC and the Russian press there is an even greater incentive to work for the Caviar Mafia. *Everyone* is in it: the police, the local government, the military, even the agency that controls all sturgeon fishing, caviar production, and sturgeon exports: the Russian Federation State Committee for Fisheries. In 1997,

Russian border guards representing the committee halted the merchant ship *Camilia*, which was carrying a huge load of sturgeon up the river Sulak in Dagestan. When the border guards started unloading the fish into trucks, the Dagestani

Water Police arrived and, with Kalashnikovs cocked, ordered the fish to be put back on the boat. A month later several bombs went off in the Russian apartment complex where guards and their families lived, killing 67 people—a suspected act of revenge by the Dagestan Caviar Mafia.



its harvest is carefully managed for sustainability. The Chefs Collaborative, which is devoted to sustainable cuisine in partnership with Environmental Defense, reports that wild Alaska coho salmon tastes far better as well. Farmed salmon is insipid, with a sort of chalkiness, compared to wild Copper River salmon, for instance. (After I tried this wild salmon a few years ago, I gave up eating farmed salmon, period.) Wild Alaska salmon is also higher in protein and lower in fat than farmed salmon.

Wild Atlantic salmon are severely threatened in North America, and no wild animals are in trade. But almost all farmed salmon is the Atlantic species and this threatens the remaining wild fish. Most of the eggs that stock the farms come from Scandinavia or Scotland. Biologists worry that escaped salmon might compete for food and habitat with the wild ones. Interbreeding would threaten the genetic integrity of the North American salmon population. Just last December, 100,000 farmed salmon escaped in Maine near three of the rivers in which the wild ones hang on, with as yet unknown consequences.

Further, the salmon are farmed in huge open-net pens at high densities that promote disease. Diseases can infect wild fish, and the drugs used to treat them enter the human food stream. Pollution is another problem: Chefs Collaborative reports that a large salmon farm produces as much sewage as a city of 10,000 people! Finally, raising salmon, which are carnivorous, is nutritionally expensive. It takes four to five pounds of fishmeal to produce one pound of farmed salmon. The fishmeal comes from anchovies and capelin, small prey species harvested off the coast of South America. The effects of removing so much prey aren't known, but biologists fear they could be profound.

The websites of several environmental groups provide extensive information to guide both consumers and cooks on how to choose fish. The Monterey Bay Aquarium

(<http://www.mbayaq.org>) offers a chart that lists seafood in three categories. *Best Choices* include albacore tuna, squid, catfish, mahi-mahi, farmed mussels and oysters, and New Zealand cod. Under *Proceed with Caution* are species the aquarium is monitoring or are okay only from certain areas, such as American lobster, bay scallops, shrimp from Georgia, snow crab, and yellowfin tuna. Under *Avoid* are bluefin tuna, Chilean sea bass, monkfish, orange roughy, tropical shrimp, and sea scallops, among others.

But what's a caviar-lover to do? *Caviar Emptor: Let the Connoisseur Beware*, a report from NRDC, SeaWeb, and the Wildlife Conservation Society, recommends paddlefish (a sturgeon relative) caviar from North Star Caviar in North Dakota or Yellowstone Caviar in Montana. Both of these non-profits return proceeds from caviar sales to community projects and to paddlefish research and conservation. Caviar from other farmed sturgeon, such as white sturgeon farmed in the U.S., is another option; this roe is said to compare favorably with Caspian osetra. But U.S. caviar production couldn't safely meet current U.S. demand if, as conservationists hope, a trade ban halts import of beluga caviar or, as conservationists fear, Caspian sturgeon continue to decline. The only choice then may be abstinence.

Perhaps it's best to just say no to roe.

Other websites with information:

Caviar Emptor—<http://caviaremtor.org>

Chefs Collaborative—<http://www.chefnet.com/cc2000>

EcoFish—<http://www.ecofish.org>

Environmental Defense—<http://www.environmentaldefense.org>

National Audubon Society Living Oceans Program—

<http://www.audubon.org>

SeaWeb—<http://www.seaweb.org>



CASPIAN CAVIAR IS PROCESSED ABOARD A FLOATING FISH FACTORY (LEFT), WHILE, IN THE RUSSIAN FAR EAST, AMUR RIVER CAVIAR IS SALTED FOR SALE TO THE "CAVIAR MAFIA" (MIDDLE) OR FOR USE LOCALLY (RIGHT).

Giant trawling ships with great bottom-sweeping nets have returned to the open Caspian Sea for the first time since the USSR banned them in 1959. Last year, TRAFFIC reported that many of Dagestan's trawlers are owned either by the Republic's Attorney General, the Minister of Internal Affairs, or the head of the Water Police, thereby remaining unchallenged on the Caspian's dark waters. During the 1990s the Russian government reported the arrest of thousands of poachers, who were fined and imprisoned for years. However, a TRAFFIC report stated that while the amount of illegal caviar seized has steadily increased since 1992, the number of poachers arrested has remained exactly the same—an indication, the report says, that most poachers behind bars are poor fishermen who failed to pay protection money.

Twilight of a Legend

While looming threats from pollution, oil, and

"killer" jellyfish are making it hard for sturgeon populations in the Caspian Sea [see "Caspian Calamities," page 18], the effect of more than ten years of unrestricted fishing has been devastating. In 1978 it was estimated that there were 142 million adult sturgeon in the Caspian. The estimate for 2001 is fewer than 300,000. As a result, in 1998 CITES placed Caspian sturgeon species on its Appendix II list, requiring that any

"When the fisherman catches a fish, guess who he has to give it to? The guys with the guns."

international trade in these species have official CITES permits, which are supposed to guarantee that the fish were caught legally and that their harvest wouldn't damage wild populations.

Still, Caspian sturgeon numbers continued to fall precipitously, and in May 2000 Vladimir Izmailov, the deputy head of the Russian State Committee for Fisheries, announced that that

year's harvest of sturgeon was so small that it would fall far short of the catch quota of 560 tons set by CITES. Legal Russian caviar exports had dropped to 40 tons in 2000, less than half the amount of the year before. There weren't even enough

adult sturgeon to supply fertilized eggs to hatcheries. Iran's *Shilat*, which still uses many of the same fishery management techniques that the Soviets had, reduced its exports from 90 to 70 tons in order to "conserve sturgeon." The illegal catch for the region remains an estimated ten times the official one. But given the mafia-style activities of government officials in the region, Birstein argues that there is no real "legal"

catch. Says Birstein, "So how can you trust their official figures? You are asking the cat to guard the cream."

The man who ostensibly has ultimate power over these committees in Russia, President Vladimir Putin, has shown himself to be no friend of con-

servation. In late May last year, Putin abolished the Russian State Committee on the Environment and the Russian Forest Service. He placed their responsibilities in the care of the Ministry of Natural Resources, the government agency that, among other things, oversees land development, logging, and mining. Experts say this was an act of economic triage, which it may indeed be, but in one swipe of his pen Putin eliminated all regulatory oversight of the Committee for Fisheries, a committee that he has told to raise its own funds. Certainly, Western conservationists say, Russians must realize that by systematically destroying their natural environment they will ultimately destroy not only their sources of income, but their food and water as well.

"There is no tomorrow in Russia," says Mats Engstrom, an American caviar distributor who has done business with the Russians for decades. "All the Russian entrepreneurs I know never invest in their own country. So the money that goes to export is not going to come back to Russia at all. Russians don't plan for the future because tomorrow the government may change the rules or put you in jail. That's the mentality."

A TURKMEN WOMAN ON THE CASPIAN ISLAND OF KIZYL SU SETS OUT BELUGA STURGEON MEAT TO DRY.



THE GAZPROM ENERGY PLANT
LOOMS OVER THE VOLGA RIVER,
A MAJOR TRIBUTARY OF THE
CASPIAN SEA WHOSE WATERS FOR
DECADES HAVE BEEN SPOILED BY
INDUSTRIAL POLLUTION AND EVEN
RADIOACTIVE WASTE.

Buffalo of the Water

It all began with a label that started to peel away from its jar. This caught the attention of U.S. customs agents at John F. Kennedy Airport who knew that legitimate caviar labels always stay stuck. But what appeared to be a routine import of Caspian caviar for a well-known

caviar continued. According to U.S. Department of Justice reports, the caviar was smuggled into Dubai by Al-Raquiati, a local trading company, which then bribed Dubai CITES officials with prostitutes to get the necessary permits. Noroozi's Dubai-based Company, Kenfood, then bought both the permits and the caviar from Al-Raquiati and exported them to Maryland.

Back in Rockville, Lolavar was also committing fraud by mixing the roe of endangered Tennessee paddlefish (*Polyodon spathula*) with real Russian caviar and selling it to clients as authentic sevruga. Lolavar even went so far as to create fake certificates and seals from a fictitious Russian supplier to provide authenticity. The scheme worked until customs agents at



A FRESHLY CAUGHT STURGEON ALONG THE VOLGA RIVER.

American trading company launched an international investigation by federal officials that exposed a caviar smuggling ring of beluga-sized proportions.

"We called it an octopus because every arm of the company was some type of illegal activity," recalls U.S. Fish & Wildlife special agent Sal Amato, who led the probe. "It was by far the most dramatic experience with caviar smuggling that I have ever encountered."

Starting in 1995, two Iranian-Americans, Hossein Lolavar and his brother-in-law Ken Noroozi, began importing large amounts of poached Russian caviar to their Rockville, Maryland-based company, U.S. Caviar & Caviar. During the course of its investigation, the U.S. government found that Lolavar had imported nearly 20 tons of caviar each year, for unsuspecting clients including American Airlines and gourmet grocery stores like Fresh Fields and Sutton Place Gourmet. Even when CITES began requiring permits for international trade in sturgeon products in 1998, the flow of now illegal

Kennedy Airport sent samples of Lolavar's "sevruga" to the National Fish & Wildlife Forensics Lab in Ashland, Oregon, where the true source of the caviar was identified. During the investigation, agents seized nearly \$3 million in illegal caviar from the company and found that, in the 1998-99 season alone, Lolavar had smuggled more Caspian caviar than the entire year's legal quota for Russia. Noroozi and Lolavar went to jail and were fined \$10.4 million, the largest penalty ever assessed for a wildlife crime.

For Amato, this case reveals the scope of caviar smuggling today. Estimated at \$125 million, this illegal trade ranks second only to illicit drugs in scale and profits. "We've already seen that people will go to the same lengths to sell caviar that they do to sell illegal drugs," Amato says. "We've seen couriers paid just like drug couriers, we've seen shipments with false-bottoms just like what you see in narcotics. And I'm talking tons and tons—not pounds."

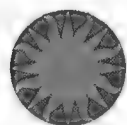
Cases like U.S. Caviar & Caviar helped bring representatives of the 152 CITES member



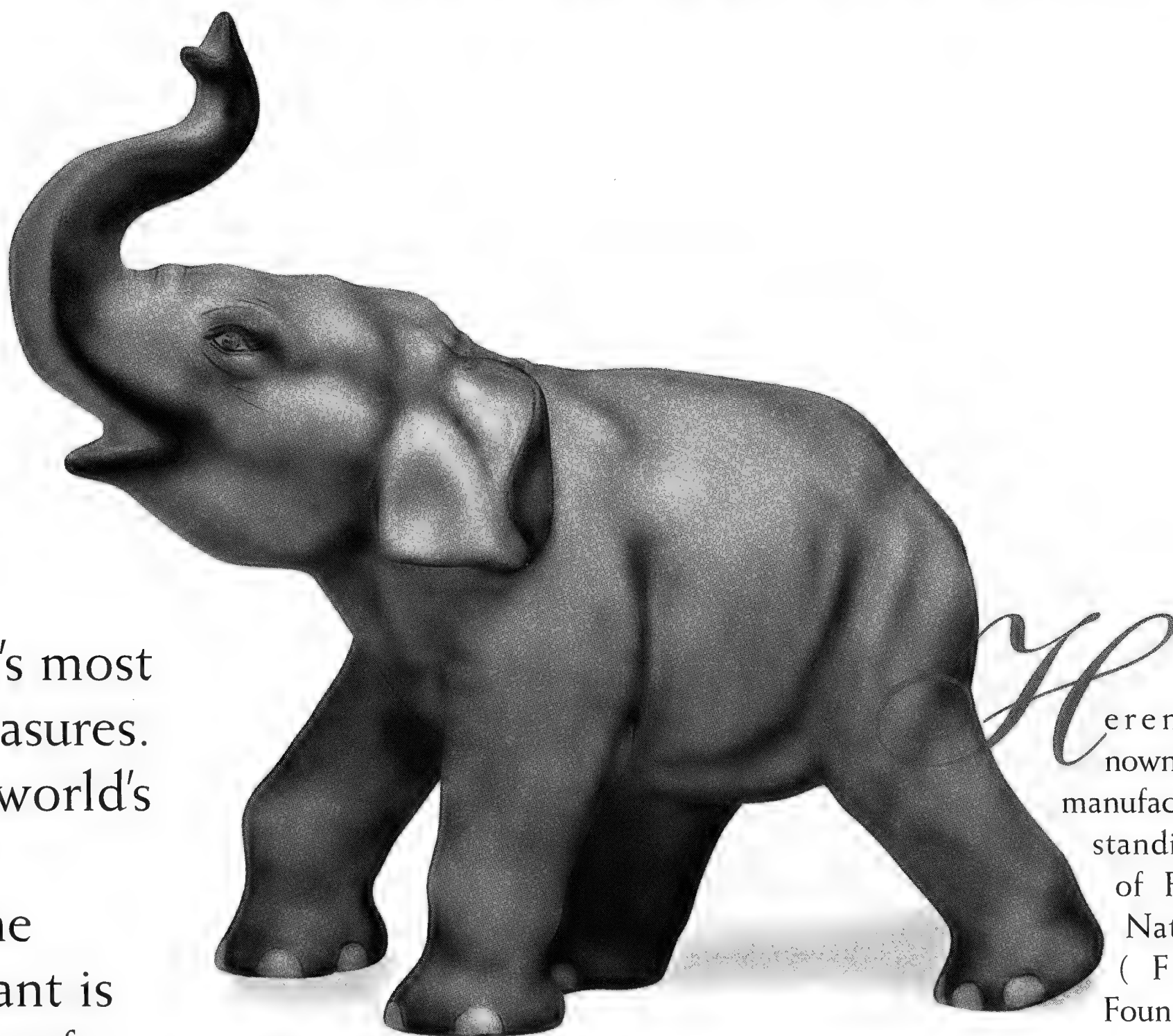
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But what makes these figurines so special is the good they can do for animals the world over. For each figurine sold, Herend will contribute a portion of the proceeds to The Smithsonian in support of their conservation and research efforts on behalf of endangered species. But how can you "capture" a Baby Asian Elephant of your own?

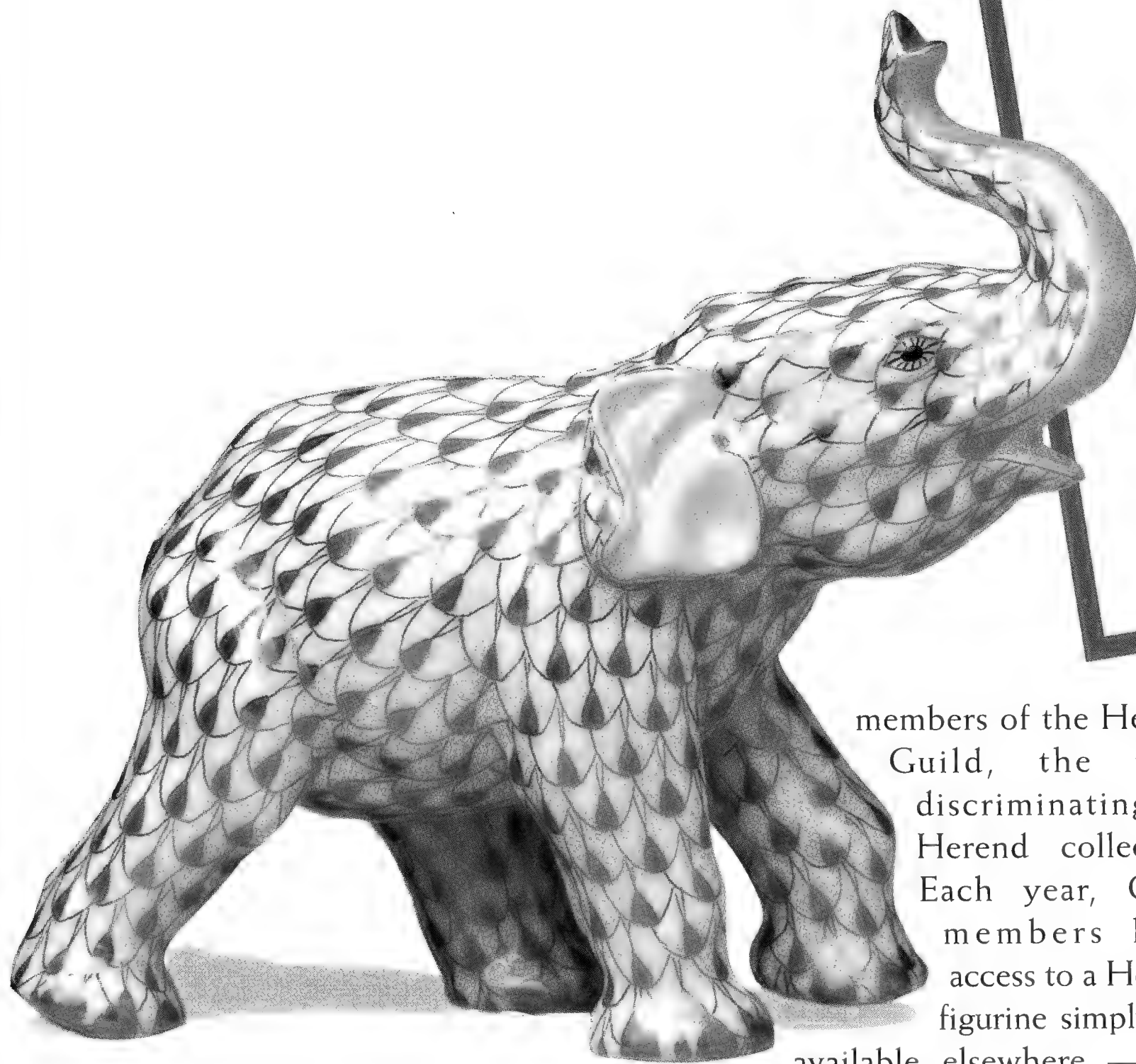
The Baby Asian Elephant is available exclusively to

Shown above:
Baby Asian Elephant
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CALL TIARA TODAY

While the membership roster is limited, FONZ members are invited to join the Guild and receive the exclusive Baby Asian Elephant figurine. To assist FONZ members, Herend has chosen Tiara Galleries and Gifts, one of the largest Herend distributors in the world — and a member of FONZ — to process orders and answer questions.

As for cost — the figurine is \$275 and a one-year Herend Guild membership is \$65. Tiara offers you both in one payment of \$340. You'll receive the Baby Asian Elephant, as well as a host of member benefits, including a beautiful welcome gift — a porcelain box, retail value \$70.

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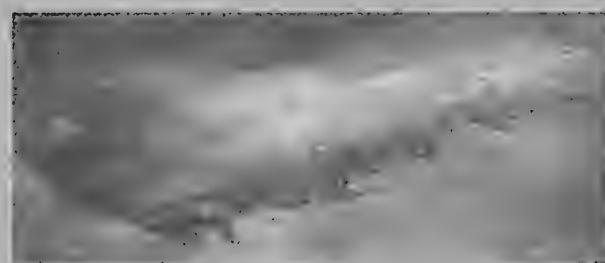
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AN AERIAL VIEW OF ASTRAKHAN, A RUSSIAN CITY OF MORE THAN 500,000 INHABITANTS SITUATED IN THE VOLGA RIVER DELTA.

CASPIAN CALAMITIES

JOHN TIDWELL



OIL SLICK ON THE CASPIAN.

Apart from the caviar trade, Caspian sturgeons' rapid decline may also be attributed to the degradation of the Caspian Sea. The largest and most voluminous inland body of water on Earth, the Caspian Sea covers about 150,000 square miles, an area nearly the size of California. Decades of waste runoff from cotton fields and factories along most of the Caspian's 130 tributaries have flooded this sea with so many pollutants that they have begun showing up in sturgeon meat and caviar. A study last year by the Institute of Freshwater Ecology and Inland Fisheries in Berlin found that caviar from the Caspian contained levels of DDT, PCB, and cadmium possibly high enough to disrupt the sturgeons's hormone levels during development, which could lead to infertile or mixed-gender fish. Manfred Wirth, one of the study's authors, said it wasn't clear what effect these pollutants might have on humans who ate the caviar from these fish.

The Caspian may also become the site of the next great oil rush, as Western oil companies vie with each other—and with the governments of Russia, Iran, Kazakhstan, Turkmenistan, and Azerbaijan—for an estimated 200 billion barrels of oil, worth roughly \$4 trillion, that lies beneath the Caspian Sea. How to get it out has been more a political problem than an engineering one, with Russia worrying that its breakaway republics will steal the deal, while the U.S. keeps a nervous eye on Iran.

"It's like the Great Game of the late 19th century," says David Aubrey, coordinator of the Caspian Environment Project, an nongovernment program started by the Caspian nations and funded by organizations like the World Bank and the UN. "And it will become

more like the California Gold Rush if things work out. But I think the real danger to the Caspian won't be from oil drilling once things get going, but from a major oil spill. That could kill everything in there."

Another threat to sturgeon is the invasion of the Caspian by a fist-sized comb jellyfish (*Mnemiopsis leidyi*) native to North America. Scientists suspect the alien jellyfish first arrived in the Black Sea—which is connected to the Caspian by the Don and Volga rivers—in 1982, carried in the ballast water of ships from the Chesapeake Bay. According to reports by Henri Dumont, a biologist at Ghent University in Belgium, the voracious jellyfish devoured nearly all of the Black Sea's zooplankton, causing a massive crash of the native fish population and crippling the local fishing industry there. This comb jellyfish species, a self-fertilizing hermaphrodite, was found in the Caspian in 1999. By the summer of 2000, the entire sea was teeming with them.

"Economic losses to the fisheries may become enormous in one to two years' time," says Dumont. "The pelagic fisheries will collapse, and the Caspian seal [*Phoca caspica*] that prey on them will follow, probably becoming extinct. *Kilka* [Caspian sardines] may recover later, as *Mnemiopsis* empties the Caspian of food and then collapse themselves, as happened more or less in the Black Sea."

Discussion among scientists and littoral state officials are underway about how to stop *Mnemiopsis*, including proposals to introduce its natural predators: the North American butterfish (*Pegellus triacanthus*) and another jellyfish, *Beroë ovata*.

POACHERS USE TRADITIONALLY HOOKED LINES TO CATCH STURGEON SPAWNING IN THE SHALLOW WATERS OF THE VOLGA RIVER DELTA.



nations together in a meeting last December in Shepherdstown, West Virginia. At issue was whether to ban the international trade of some of the most coveted species of sturgeons, including beluga, osetra, and sevruga. A final decision is not expected until this June, but the dire situation of Caspian sturgeon species has

sturgeon conservation is from export of caviar and meat. If there is no export there will be no sturgeon.” (In fact, many international conservation programs for the Caspian Sea are already in the works, including a \$20 million pledge from the World Bank to help Azerbaijan build hatcheries and clean its coastline.)

dealers will simply run out of sturgeon. Russia’s native conservation organizations, which are numerous and dedicated, nevertheless are powerless (and penniless) to stop what appears to be an inexorable march toward the commercial extinction of Caspian sturgeon species.

Some also fear that a ban on legal trade will only drive the caviar market underground and fuel even greater illegal activity. Ronald Orenstein, president of Canada’s International Wildlife Coalition, disagrees, and likens the caviar trade to an earlier illicit trade: ivory.

“With ivory the commodity wasn’t ivory—it was *legal* ivory,” he says. “In that case the only way the

In the southern Caspian Sea, Iranian sturgeon hatcheries—the conservation poster-children of the region—diligently toil away producing and releasing as many fry as they can. Manfred Wirth of Berlin’s Institute of Freshwater Ecology and Inland Fisheries says most experts agree you need to release at least 150 million baby sturgeon each year to maintain the fishery. So far, Iran has produced only about 50 million per year, and the other littoral states even fewer. But Birstein points out that there have never been any scientific data on how many of these babies actually survive to adulthood, raising the question of whether these official releases are more political gestures than effective aquaculture.

But all is not completely lost. Even if the Caspian fishery collapses and all the smugglers pack their nets for greener pastures, remnant beluga and other sturgeon populations may still survive here and there. Small numbers are also being raised on a handful of tiny fish farms in places like Hawaii, Canada, and Florida. Even Birstein holds out hope that Caspian sturgeon will not go the way of the dinosaurs just yet.

“These fish have survived for 250 million years,” Birstein says. “They have lived through a lot of disasters, and I think they will survive this one too—barely.” Z

—John Tidwell, a freelance writer and independent television producer, last wrote about poisonous pitohuis in the March/April 2001 issue of *ZooGoer*.

Reza is a world-renowned, Iranian-born freelance photographer who now lives in Paris.



THOUSANDS OF CASPIAN STURGEON FILL A FISH FACTORY FLOOR ALONG KAZAKHSTAN’S URAL RIVER.

made a ban on Caspian caviar a real possibility. The Russian Committee for Fisheries has even hinted at an official sturgeon fishing moratorium of its own next year, although experts believe it would not stop the poaching entirely.

Opinions on whether a trade ban would help save Caspian Sea sturgeon seem to break cleanly between conservationists and supporters of the legal caviar trade. Conservationists say a ban would send a strong message to nations like Russia and Iran to straighten up and manage their fisheries properly. Caviar traders retort that such a move would be disastrous for the teetering economies of the Caspian nations and halt all conservation efforts there.

“Who will pay for sturgeon hatcheries if there is no trade allowed?” asks Armen Petrossian, president of Petrossian Paris, one of Europe’s largest caviar traders. “The only source of

illegal market could thrive was because it was piggy-backed on the legal trade, and smugglers could disguise it as legal. But as it turns out there wasn’t a big market for hot ivory, so with the cloak of legality removed from it, the illegal ivory market collapsed.”

However, because CITES governs only international trade, a ban would have no effect on, for example, Russia’s domestic caviar demand—which seems to be insatiable. There, Ornstein asserts the sturgeon market is doomed because

THE FUTURE OF THE BELUGA AND ITS STURGEON COUSINS DEPENDS ON INTERNATIONAL COOPERATION—AND THE RESPONSIBILITY OF INDIVIDUAL CONSUMERS.



©TODD STALEY / TENNESSEE AQUARIUM



"No reasonable argument can be advanced in favor of preservation of any lobo and timber wolves, mountain lions or predatory bears."

So said J. Stokely Ligon, the first Predatory Animal Inspector of the U.S. Bureau of Biological Survey, a precursor to the U.S. Fish & Wildlife Service

WOLF ON THE

(USFWS). Beginning in 1915, his responsibility—and his passion—was bringing about the “total extermination on the open range” in New Mexico of the Mexican gray wolf, known as *el lobo*. Only then would sheep and cows and game be safe from all but their rightful human predators.

Ligon did his job well. He claimed that about 300 wolves lived in New Mexico in 1916; 70 in 1917; 12 in 1919. In 1920, Ligon was dismayed to see his total extermination plan foiled by wolves crossing the border from Mexico. So trappers were assigned to patrol the border to keep out the invaders. Later, in 1946, the man who then held Ligon's position (now in the USFWS) advocated erecting a wolf-proof fence along the entire border! That proposal didn't go far, but soon thereafter control officers began using the strong poison known as Compound 1080 (sodium fluoroacetate) to kill wolves—and training their counterparts and ranchers in Mexico to do the same. This worked. The last confirmed Mexican wolf sighting in the U.S. occurred in Texas in 1970. The animal was shot on sight. Meanwhile, wolves became increasingly scarce in Mexico.

Then, in 1976, reflecting a new attitude toward predators, the USFWS listed the wolf as endangered and protected under the U.S. Endangered Species Act. Essentially the same agency that succeeded so well in extirpating Mexican wolves was now charged with bringing them back. So the USFWS sent a trapper to Mexico to find wolves for a breeding program. Between 1977 and 1980 he managed to capture four males and one female,

MEXICAN WOLVES BRED AT THE NATIONAL ZOO AND OTHER ZOOS MAY CONTRIBUTE TO A RECOVERY OF THE ONCE EXTINCT WILD WOLF POPULATION.

which were sent to the Arizona-Sonora Desert Museum in Tucson. These were the last wolves of this subspecies known to live in the wild. Fortunately, the female was pregnant and, along with a few other wolves already in zoos, these animals founded the zoo population.

The 1982 Wolf Recovery Plan called for reintroducing Mexican wolves to the wild, but it took 16 years of political and legal wrangling before 11 wolves were released into southeastern Arizona's Apache National Forest

in 1998. Since then, there have been several additional releases, with more planned for this year. There have been setbacks as well, including at least five wolves killed by people,

one as recently as last December. Happily, pups have been born too. Today, about 23 Mexican wolves roam freely, representing nearly one-quarter of the recovery plan's goal of a wild population of 100 animals.

About 200 Mexican wolves also live in 39 zoos in the U.S. and Mexico—and that number is about to become 40 when next month the National Zoo becomes part of the American Zoo Association/USFWS Mexican wolf program and welcomes a pair of these canids to Beaver Valley. Zoo staff hope that they will breed as early as the spring of 2002. Eventually, their young or grand-young may be selected for release into the wild. Previously, grand-young of red wolves that lived at the National Zoo were released into Alligator River National Wildlife Refuge in northeastern North Carolina. Like the Mexican wolf, the red wolf was extinct in the wild, but now, as a result of a zoo breeding and reintroduction program, an estimated 96 red wolves live freely.

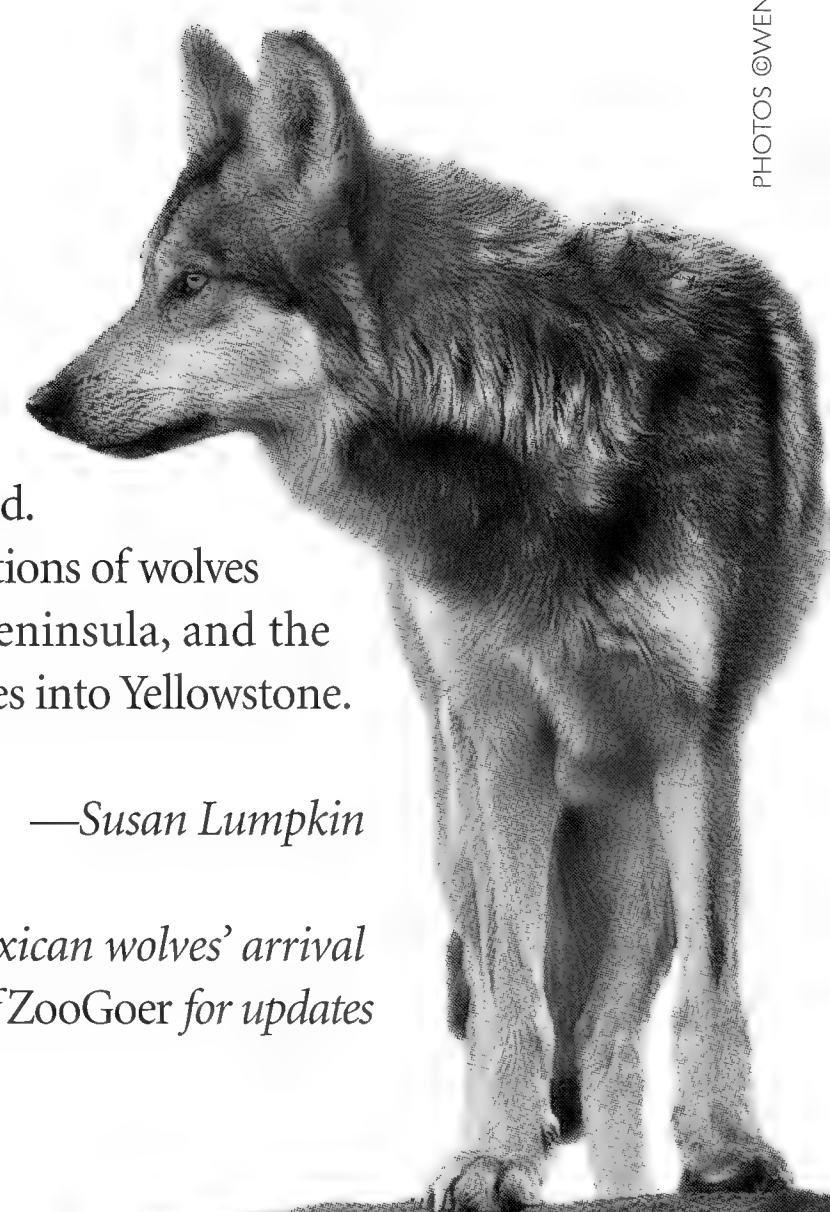
The Mexican gray wolf (*Canis lupus baileyi*) is a subspecies of the gray wolf, and considered to be the most genetically distinct of North America's five gray wolf subspecies. Most scientists believe the red wolf (*Canis rufus*) is a separate species. With much controversy, the USFWS has proposed that all North

American wolves except these two be downlisted from endangered to threatened.

It cites as justification burgeoning populations of wolves in Minnesota and Michigan's Upper Peninsula, and the highly successful reintroduction of wolves into Yellowstone. A ruling is expected this summer. *Z*

—Susan Lumpkin

Visit www.fonz.org for news of the Mexican wolves' arrival at the Zoo and look for forthcoming issues of ZooGoer for updates and details.



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THE REVERED, REVILED CROW CLAN

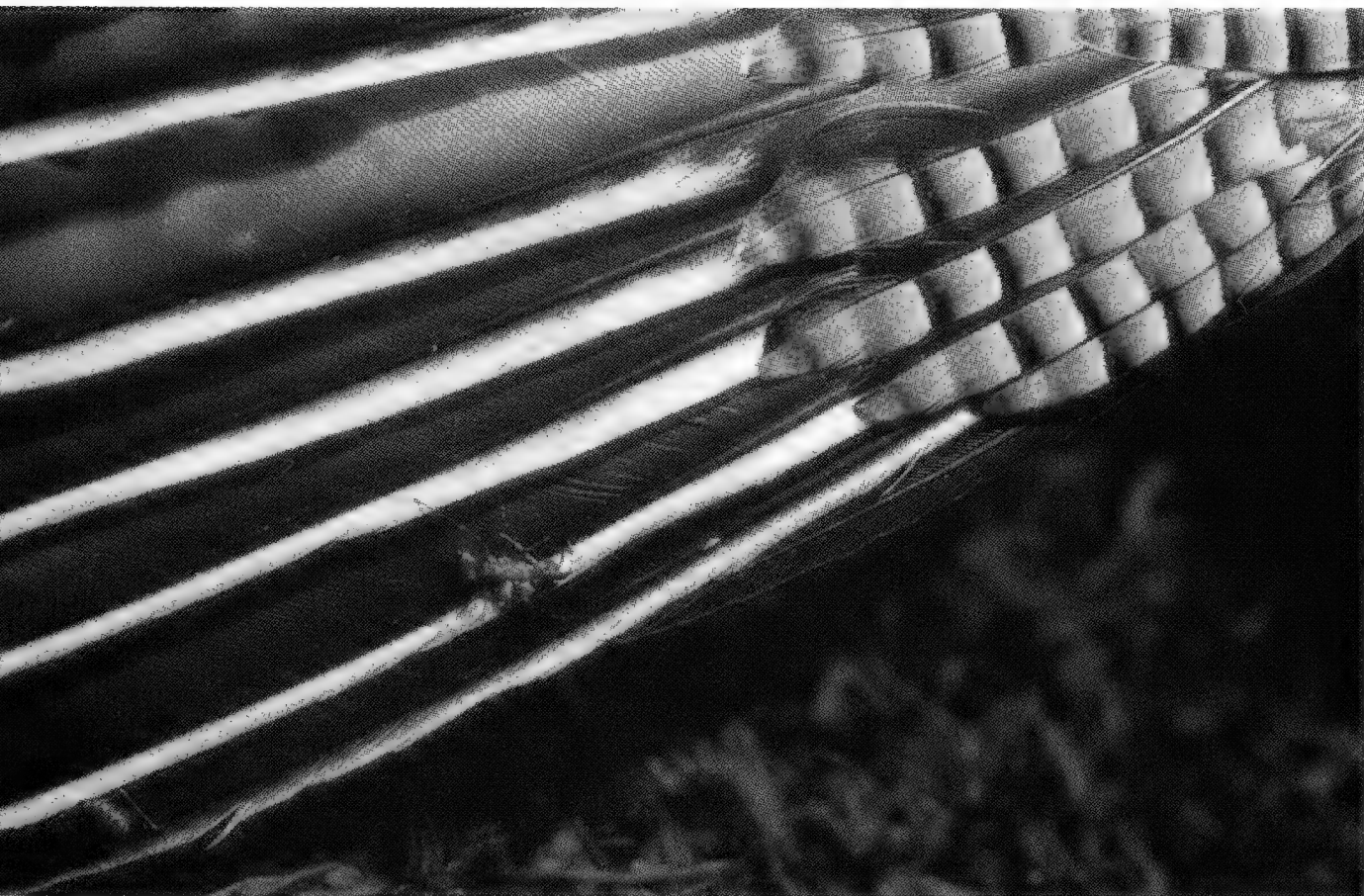
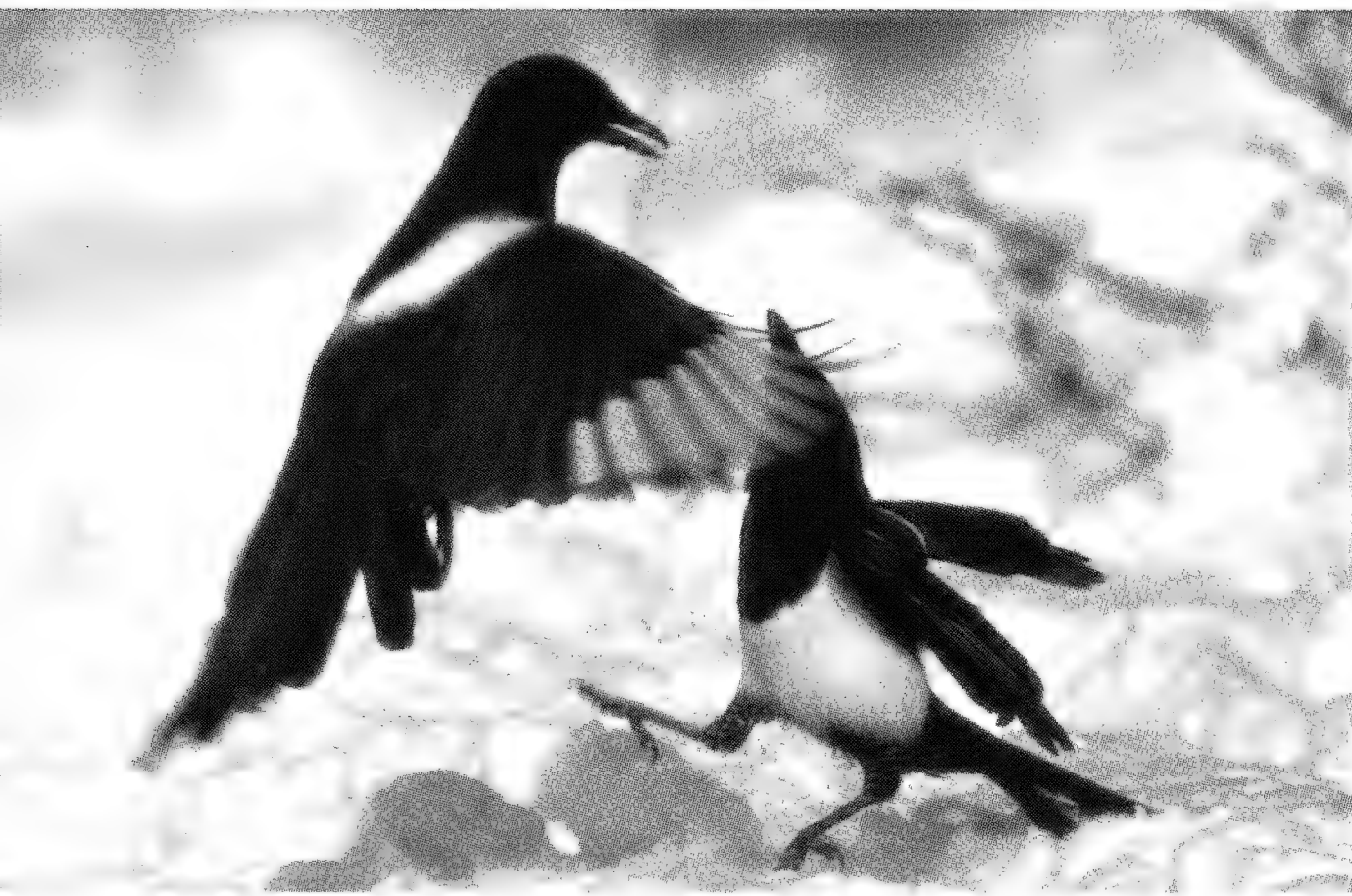
For centuries, a dark specter haunted the bloody battlefields of Europe. Waiting to feast on the dead, common ravens lined up at bloody clashes between invaders and invaded, tribes and kingdoms. War-weary observers could not ignore the jet-black scavengers, with their four-foot-wide wingspreads and cross-shaped flight profiles. Ravens, not surprisingly, were branded harbingers of bad luck, or death.

Away from the carnage, common ravens (*Corvus corax*) also coasted into folklore, legend, and language, strongly hinting that these creatures and their 100-plus brethren in the family Corvidae are not your average birds. Two ravens, Hugin (Thought) and Munin (Memory), rode the broad shoulders of the Norse god Odin. In Inuit legend, the raven became creator and trickster. In the Bible, Noah sent not only a dove but also a raven to seek land, as did many ancient mariners. Tame ravens still stroll within the Tower of London's walls, where for centuries they've been sequestered as guardians against invasion.

One reason why ravens, crows, jackdaws, rooks, magpies, treepies, choughs, nutcrackers, and jays

stand out is that they have above-average brains—proportionately, they possess the largest cerebral hemispheres of the feathered set. Plucky, crafty, curious, social, vocal, and adaptable, corvids, as family members are known, are among our most familiar yet enigmatic neighbors. On all continents save Antarctica, they flourish in backyards and wilderness, although more than 20 species barely hang on within shrinking habitats. Ethiopia's thick-billed raven (*Corvus crassirostris*), bigger than a red-tailed hawk, is the world's largest songbird, while the dun-colored Hume's ground-jay (*Pseudopodoces humilis*) of the Tibetan plains is the smallest family member. In between lies a broad spectrum of glossy, splashy, and plume-tailed characters.

BY HOWARD YOUTH



FROM TOP: CRESTED JAY (*PLATYLOPHUS GALERICULATUS*); MAGPIES (*PICA PICA*);
WOOD ANTS ON THE WING OF A EURASIAN JAY (*GARRULUS GLANDARIUS*).

The Smart and the Damned

Are ravens the most intelligent of birds? Many think so. But comparing ravens with other birds such as parrots is "...like saying what is better, apples or oranges," says Bernd Heinrich, a field biologist and University of Vermont biology professor who for the last 16 years has studied

crows, which he castigated for destroying desirable gamebirds and vacuuming up crop fields of their tender shoots. (While crows do take young birds and eat some crops, they also eat many pest insects.) Even Popowski had to admit that much of the "problem" with crows stemmed from their adaptability and wiles. He quotes the great

the private lives of wild and captive common ravens. In his book, *Mind of the Raven*, Heinrich writes, "I have become skeptical that the interpretations of all ravens' behavior can be shoehorned into the same programmed and learned responses.... Ultimately, knowing all that goes on in their brains is, like infinity, an unreachable destination."

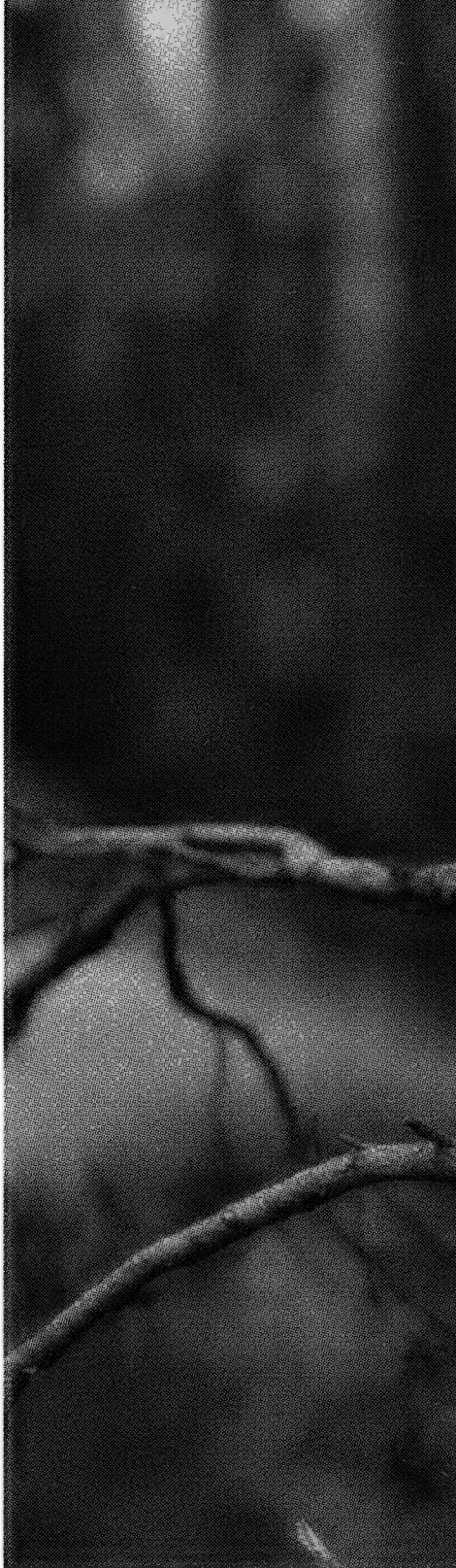
After widespread persecution and decline over the last century, common ravens are rebounding. They nest on transmission towers and telephone poles and dine at landfills, on roadkills, and even on threatened species, including the eggs and young of desert tortoises (*Gopherus agassizii*), least terns (*Sterna antillarum*), and snowy plovers (*Charadrius melodus*). In the eastern U.S., the raven rebound has been less steady than in the West. Locally, these graceful birds can be easily seen in Shenandoah National Park and other parts of the Appalachians. A few pairs breed at and around Sugarloaf Mountain in Frederick County, Maryland, from which visitors, and most likely the ravens, can see downtown Washington, D.C., on a clear day.

While ravens stick to the outskirts of many cities, other large black corvids thrive within them. Each region seems to have one or two super-abundant species. "The [American] crow is the bold bad swashbuckler of the avian world," wrote Bert Popowski in his 1946 book *Crow Shooting*, a call-to-arms against

naturalist Henry David Thoreau, who wrote "...if men had wings and bore black feathers, few of them would be wise enough to be crows."

When Popowski's book was published, crows were under constant fire: "There is no state in which the crow is not listed as a varmint bird, making it a favorite out-of-game-season target for both rifle and shotgun enthusiasts." Many states offered bounties. Roosts were sometimes blown apart with dynamite. Since the mid-1970s, however, crow hunting has been regulated. The birds are now treated as native birds instead of worthless pests that can be killed indiscriminately. Regardless, hunting does not seem to have much impact on crow populations, which keep growing along with the human population.

In most urban and suburban areas of North America, American crows (*Corvus brachyrhynchos*), ravens, or magpies (*Pica pica*) are among the most familiar birds. Their trash-scavenging, nest-raiding, pest-eating habits are mostly ignored, or sometimes greeted with half-hearted scorn (unless large, messy roosts pop up where people live, work, or shop, in which case scorn turns to rage). Overall, crows are at times persecuted but usually tolerated. In India, for example, house crows (*Corvus splendens*) and jungle crows (*Corvus macrorhynchos*) work alongside cows and pigs to clean the streets of trash. Crow experts Steve Madge and Hilary Burn wrote in their 1994 book *Crows and Jays* that the house crow is "possibly the only bird species totally dependent upon man for its existence." British ornithologist Derek Goodwin, in his book *Birds of Man's World*, wrote that the close union between house crow and human may have emerged because both



SOUTH AMERICA'S PLUSH-CRESTED JAY (*CYANOCORAX CHRYSOPS*).



BENGT LUNDBERG/BBC NHU PICTURE LIBRARY

TWO JUVENILE RAVENS (*CORVUS CORAX*) PERCH IN A TREE IN SWEDEN.

species preferred the same habitat and because “no part of [the crow’s] original home is now not overrun by human beings!”

Such dependence seems to assure a bright future for this bird. During my two years living in Madras, India, I daily saw both house and larger jungle crows riding on the backs of pigs, dining on watermelon rinds and other trash, ducking in and out of bustling train station platforms, or snatching morsels through open windows. These birds took advantage of all available amenities. House crows also have what you might call wanderlust. They regularly hitchhike on ships, no doubt to find food. From time to time, birds stay onboard ships as they cruise out of Indian, Pakistani, and Sri Lankan harbors. Satellite breeding populations now inhabit port towns in the Middle East, in various Asian sites including Singapore, in East Africa, and even in Mozambique and Durban, South Africa. Shipboard stowaways have turned up as far away as Australia, Japan, and at least twice in the United States. It seems the house crow is a strong candidate for the title of the dandelion of corvids.

Fancy, and Not So Fancy, Feasts

Corvids use their guile and versatile, strong bills to procure an amazing assortment of foodstuffs. In some species, such as many jays, vegetable matter makes up 75 percent or more of the diet, while ravens and others are consummate carnivores. Consider the

typical menu sought by the plush-crested jay (*Cyanocorax chrysops*), South America’s most widespread corvid. This gaudy bird flashes through the subtropical and tropical forest in noisy foraging flocks, following swarming army ants that kick up panicked insects and small lizards, plucking ripe berries, snatching an occasional wild bird egg or chick, and, at the forest edge, picking up table scraps and crop seeds.

Other corvids have far more specialized tastes. For instance, the ranges of the western U.S.’s pinyon jay (*Gymnorhinus cyanocephalus*) and Eurasia’s northwestern populations of nutcracker (*Nucifraga caryocatactes*) match almost exactly the ranges of their favored food plants, pinyon pine and spruce, respectively. But even these birds indulge in other birds’ nestlings and eggs, insects, and a variety of other seeds—especially during nesting season or in times of food shortage.

Of course, crows and ravens are well known as trash eaters, common loiterers of street and

landfill. Mount Everest explorers even found yellow-billed corvids called alpine choughs (*Pyrrhocorax graculus*) scavenging kitchen scraps at 27,000 feet. In the Alps, many skiers now find these high-altitude birds loitering around resorts for the same reason.

There seem few limits on what crows can learn in their quest for food. In Finland, hooded crows (*Corvus corone cornix*) learned to pull up, bill to foot to bill, the ice fishing lines left by fishermen to procure fresh catches. In 1996, New Zealand biologist Gavin R. Hunt documented New Caledonian crows (*Corvus moneduloides*),

birds unique to that far-flung Pacific archipelago, carefully snipping rigid leaf pieces and fashioning them into two types of tools. The crows carried these tools with them as they flew to feeding areas, where they used hooked and narrow-tipped tools to fish out insects from hard-to-get spots. This discovery sparked debate over whether the birds’ tool making was standardized, a manufacturing feat generally only attributed to humans. While no one seems likely to step up and claim that crows are more intelligent than chimpanzees (*Pan troglodytes*)—which catch termites and ants using modified but not standardized twigs and stems—the discovery marks a watershed in animal tool use.

BLUE JAYS (*CYANOCITTA CRISTATA*) BURY ACORNS TO PREPARE FOR WINTER.



JESSIE COHEN/NZP

The late Indian bird expert Salim Ali wrote of the house crow: “Revels in puckish antics such as playfully tweaking tails of other birds, or ears of sleeping cow or dog, or toes of flying foxes hanging on their diurnal roosting trees, with no apparent object other than to enjoy their annoyance and discomfiture!” Common raven pairs often perform similar stunts with eagles, with

seen sliding down snow banks on their backs—clearly not food-seeking behavior. Whether or not play is strictly a means of honing certain survival skills is something I’ll leave for the experts to puzzle over. Clearly, a wide range of skills benefits birds that make their living off of the trappings of our civilization or food provided by other creatures.

they empty when they reach their hiding places. The Clark’s nutcracker model holds as many as 90 pine seeds.

A Family Affair

Ravens, which may live up to 30 years, and many crows and magpies mate for life, while most jays seek new mates each breeding season. Unlike

“...if men had wings and bore black feathers, few of them would be wise enough to be crows.”

food acquisition being the primary goal. One bird tugs a tail feather while the other darts in to steal the raptor’s fish or other prize meal. They even use similar tactics with coyotes (*Canis latrans*) and gray wolves (*Canis lupus*). It is easy to see how play and food acquisition go hand in hand with corvids, the artful dodgers of the bird world.

That’s not to rob the corvids of their fun. There is plenty of evidence that crows play when not seeking food. They’ll swing upside down to hang from perches, and drop objects and fly down to snatch them. Common ravens have been

Once food is found, corvids do not always wolf it down. Most corvid species hoard food, at least from time to time. This helps them survive and even nest during lean times. Clark’s nutcrackers (*Nucifraga columbiana*), for instance, may tuck 30,000 pine seeds into the ground from late summer to fall in preparation for winter. Meanwhile, blue jays (*Cyanocitta cristata*) and Eurasian jays (*Garrulus glandarius*) are famed for burying acorns. Any forgotten larder often shoots up as tender young saplings the next spring. Some species carry their booty in throat pouches, which

cardinals, orioles, and many other familiar songbirds, corvids are monomorphic—males and females have similar coloration. This, of course, does not keep these birds from breeding. Pair bonds grow through bobbing courtship displays, feeding and bill-tapping rituals, swooping and diving flights, mutual preening, and special vocalizations. (Ravens have at least 30 documented calls, crows more than 20—and some of these are only heard during courtship.)

Many species build bulky, stick-jumbled nests, which are usually cupped and in some cases

RAVENS AND CROWS ARE KNOWN FOR DAREDEVIL CHALLENGES AND PLAYFUL TAUNTS TO POLAR BEARS AND OTHER LARGE CREATURES.





ROBERT E. MUMFORD, JR., NATURAL IMAGES PHOTOGRAPHY

AN AMERICAN MAGPIE (*PICA HUDSONIA*) SCAVENGES THE REMAINS OF A RABBIT.

domed, as in those made by some magpies. In most species, both sexes share nest-building duties. Females generally incubate an average of four to six eggs, but when it comes to feeding young, both parents usually share the work. Often, males also feed incubating females.

While some corvids, notably Eurasia's rooks (*Corvus frugilegus*), nest colonially, most set up defended territories and go it alone. However, the nesting pair, depending upon the species, is not always completely alone. Biologist Lawrence Kilham, studying American crows on a Florida ranch, found that these birds, unlike other known crows (except occasionally the northwestern crow, *Corvus caurinus*, of the Pacific Northwest), often breed cooperatively. Yearling birds assist adults at all nesting stages, helping to build nests, spot predators, and feed incubating females and young. "Remaining on natal territory gives juveniles and yearlings a chance to learn which predators are most dangerous, where to find food in various seasons, and other aspects of life important to survival, at less risk than if they were on their own," writes Kilham in his book *The American Crow and the Common Raven*.

Some jays also do this. Nesting Florida scrub jays (*Aphelocoma coerulescens*), endemic to the Sunshine State's stunted oak woods, are assisted by one to six young helpers. These assistants, previous nestlings, apparently help guarantee better survival rates for the next generation, while getting valuable life experience themselves. Cooperative breeding has also been found in azure-winged magpies [see sidebar, right] and Taiwan magpies (*Urocissa caerulea*).

There are other twists too. Mexican jays (*Aphelocoma ultramarina*) in Arizona may shuttle between several nests maintained by a flock. Flocks of Mexican and Central American brown jays (*Psilorhinus morio*) maintain only one nest at a time, in which

one or several females lay their eggs.

Many corvids, once the young are out of the nest, travel around in small or large, frequently noisy, post-breeding flocks. These groups scour countryside, streets, or forests for food. Winter roosts of crows form from fall until early spring. At these night roosts, up to 50,000 birds may be packed into one acre. Rockville, Maryland's famous fall and winter roost now gathers in trees lining large parking lots along a stretch of Rockville Pike. The dawn and dusk goings and comings of countless crows against a rose sky is perhaps the city's most awesome natural spectacle.

Death and Disease

Nowadays, we look to our crow neighbors to help us gauge the spread of a much-feared illness. The West Nile virus, a sickness widespread in the Old World, first reached U.S. soil in New York in 1999. American

crows soon became important indicators of the mosquito-borne virus because crow die-offs occurred as the birds were exposed to the new pathogen. To date, dead crows found as far south as North Carolina have tested positive for West Nile. In a paper published in 2000 in the National Center for Infectious Disease's journal, National Zoo Conservation & Research Center biologists John H. Rappole and Scott R. Derrickson and their Czech colleague Zdenek Hubalek wrote that migratory birds, including crows, could contribute to the virus's spread, and that longer-distance migrants such as ducks or gulls may, in the future, help facilitate outbreaks throughout the Western Hemisphere.

CAVE SECRETS SOLVE MAGPIE MYSTERY

Foraging flocks of beautiful azure-winged magpies (*Cyanopica cyanus*) grace Chinese, Korean, and Japanese forests and gardens—and, for some vexing reason, those in distant Spain and Portugal. For years, the 1,800-mile gap between the birds' European and Asian populations sparked much debate between two camps of ornithologists. One camp insisted that Portuguese mariners introduced Asian magpies to the Iberian Peninsula in the 1500s. The other believed that the birds' once-extensive range broke up and shriveled during the last glaciation, between 125,000 and 10,000 years ago.

Aside from the question of location, scientists note that the isolated Euro-birds are clearly a different subspecies from those of Asia. Among other things, they are smaller and lack their Asian brethren's whitish tail tips. Many scientists in the glaciation camp pointed to these characteristics as hard evidence that such evolutionary change could never take place over the mere five centuries posited by the mariner camp.

With a new century came an apparent end to the contention. It now appears that the glaciationists have it. In 2000, the University of London's Joanne H. Cooper published a paper in the journal *Ibis* documenting the first fossil record of an azure-winged magpie in Europe. Two specimens turned up in caves on Gibraltar at late Pleistocene sites. At one site, campfire charcoal was carbon-dated back more than 44,000 years. The other remains turned up near tools of the type used by Neanderthal man. Previously, azure-winged magpie fossil remains had only been found in China. It appears that those in the mariner camp will have to, well, eat crow.

—Howard Youth

In the East, intensive spraying campaigns, feared by many to be harmful to wildlife and potentially to humans, aim to control the disease's spread by combating mosquitoes in affected areas. Crows are not suspected to have brought the virus, since North American corvids do not migrate across the Atlantic. A trans-Atlantic migrant species (such as a duck called the Eurasian wigeon, *Anas penelope*) would be more likely, but more likely still would be birds legally or illegally imported into New York.

So far, the disease has killed thousands of birds and eight people. In October 2000, the U.S. Geological Survey (USGS) revealed that lab experiments proved what had been previously feared—that birds can spread the disease among themselves without the presence of a mosquito vector. “We know that crows are highly susceptible to the virus and that they are more likely than other bird species that live in close contact with one another to transmit the disease to other crows,” said Robert McLean, director of the USGS National Wildlife Health Center. “We know that the virus attacks the crow’s entire body and often affects all the major organs. So far we don’t know how sensitive other bird species are to the West Nile virus.”

Another introduced pathogen could finish off an endemic crow that lives in the United States’ most far-flung state. The Hawaiian crow (*Corvus hawaiiensis*), or ‘Alala, is one of the world’s most endangered species. In the past, these forest crows flourished, but they have since declined due to large-scale, human-wrought habitat change, introduced diseases and predators, and shooting. Today, fewer than 30 individuals remain, 26 of which live in a breeding facility on the island of Hawaii. There, an endangered species recovery team that includes the Zoo’s Scott Derrickson looks for ways to save the species. Toxoplasmosis, a disease usually fatal to the island crows, has been spread by feral cats, which are difficult to control in Hawaii’s lush forests. Meanwhile, the crows’ traditional predators, endangered ‘Io (*Buteo solitarius*), or Hawaiian hawks, find the few remaining disease-addled wild crows to be easy targets.

Other corvids lead precarious lives due to habitat destruction in their limited ranges,

including the Ceylon magpie (*Urocissa ornata*), Mexico’s dwarf jay (*Cyanolyca nana*), the Sichuan jay (*Perisoreus internigrans*), and the white-necked crow (*Corvus leucognaphalus*) of Haiti and the Dominican Republic. Little is known about most

This discovery sparked debate over whether the birds’ tool making was standardized, a manufacturing feat generally only attributed to humans.

of these threatened birds. In many ways, even the natural histories of the commonest crows remain a bit murky. For example, many would like to know how the expansive breeding range of the gray-and-black hooded crow became sandwiched between that of the species’ all-black populations, called the carrion crow (*Corvus corone corone*). Many experts believe that the last ice ages cleaved and isolated the black crow populations, and that mutation produced the hooded population in one of the enclaves. Then, after glaciation, the once-separated populations merged. Russian biologist Alexei Kryukov has toiled over this issue for years, and studied these birds at one of their hybridization zones in Siberia. “According to my recent molecular data, both forms—black and gray—are very similar,” he says. “I speculated that their origin was in East Asia, and that the black spread to Western Europe, then divided to three forms [two black and one gray and black], which formed two hybrid zones recently.”

Recent findings paint a somewhat similar picture for California’s ravens. A December 2000 USGS press release declares that “ravens from Minnesota, Maine, and Alaska are more similar to ravens from Asia and Europe than they are to ravens from California.” The reason: genetic testing yielded dramatic differences between the populations, suggesting that California’s ravens might have become marooned from other raven populations perhaps two million years ago. Similarly, the American West’s black-billed magpie is now considered by many experts to be the American magpie (*Pica hudsonia*)

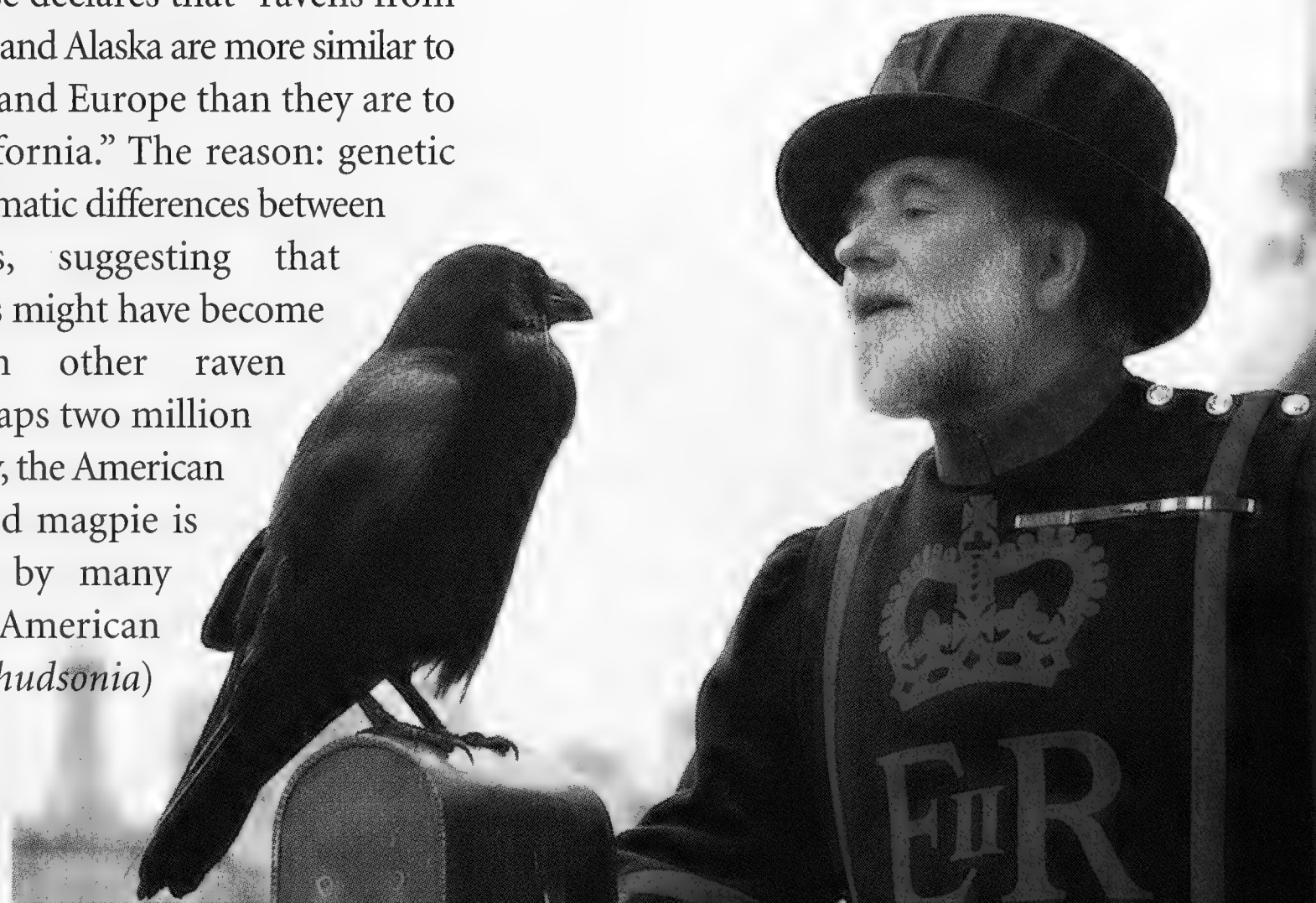
because it exhibits more genetic similarities to California’s yellow-billed magpie (*P. nuttalli*) than the widespread magpie (*P. pica*) of Eurasia, with which it once shared species status.

Other mysteries relating to common corvid distribution await resolution. Many birders and scientists, for example, puzzle over the coexistence of two eastern North American crows that are virtually indistinguishable in the field when silent. Some experts theorize that fish crows (*Corvus ossifragus*) form a “superspecies” with two Mexican crow species and are not as closely related to

American crows as they might appear. The two species can only be identified in the field by their different calls—“caw” in American crow and “cu-uh” in fish crow. However, even this identification tool is not 100-percent sure. Members of both species feed and breed at the Zoo and in Rock Creek Park; they winter together in huge roosts.

As human cities and suburbs grow, so do populations of many of the world’s scrappy corvids. As any successful businessperson will tell you, when it comes to survival, flexibility is key. You must adapt to the market, and find your niche. So it goes with both corporate or corvid survival. While many still disdain the sight of crows, few can deny that their widespread presence is testimony to their success, and ours. Z

—Contributing editor Howard Youth currently lives in downtown Madrid, where magpies expertly navigate rooftop forests of television antennae.



BOOKS, NATURALLY

National Geographic's Guide to Wildlife Watching.

Glen Martin. 1998.

The National Geographic Society, Washington, D.C. 352 pp., clothbound. \$25.

The Nature of North America: A Handbook to the Continent.

David Rockwell. 1998.

The Berkeley Publishing Group. 379 pp., clothbound. \$15.

A few years ago, my husband, daughter, and I were fortunate enough to spend nearly four weeks driving from our home in Washington, D.C., to Dillon, Montana, and back. With no fixed timetable or itinerary—Dillon was the only required stop—we meandered along, on and off the freeway, visiting schlock stops like Graceland and the Pro Football Hall of Fame as well as scenic natural wonders like Yellowstone National Park and the Badlands of South Dakota. Selecting sites like these was easy: We had a good idea what we'd find. Other days the decision-making was harder. Did the potential interest or sights of this refuge or that park justify 50 miles on dirt road? Once there, could we find lunch or lodging? Basically, we threw the dice with each detour.

Having *National Geographic's Guide to Wildlife Watching* would have loaded the dice in our favor. Subtitled *100 of the Best Places in America to See Animals in Their Natural Habitats*, this guide is an indispensable travel companion for anyone interested in seeing the

diverse creatures native to the United States in the wild. And it is useful whether you have weeks or days or even just hours to explore a bit of the natural world.

The guide organizes the featured sites by region—western, central, eastern—and then by state. Each state boasts at least one and up to as many as four recommended places for wildlife watching. For each site, there is a concise but comprehensive text describing the habitat, the most prominent species, the best times to visit, how long you should spend, and features of the site.

In addition, a summary box entitled "The Facts" accompanies the text for each site and includes a map, driving directions, open hours, and other essential visitor information.

The featured sites are a nice mix of the famous—Adirondack Park and Glacier National Park—and the obscure. Among the latter, and close to home, is Cranesville Swamp Preserve on the West Virginia–Maryland border. This intriguing spot, described as a "small segment of the Pleistocene," offers easy access and a chance to see beavers, bobcats, and coyotes. Farther afield, Arizona's Muleshoe Ranch Cooperative Management Area is a great place for coatis and collared peccaries, species we in the East think of as zoo animals.

Wildlife Watching is illustrated with more

than 150 beautiful color photographs, as you'd expect from the National Geographic Society, and includes a mini field guide describing 100 different animal species you might see in the United States. Overall, this lively overview of the natural areas of North America makes good reading even if you're not on the road. And if you're undecided about this summer's vacation, this book will help you make up your mind.

I also wish we'd had *The Nature of North America* to consult on our cross-country adventure. The title sounds a bit formidable, as does its billing as "the definitive reference to North American natural history." In fact, this is the rare reference book that can be called delightful. In short essays, articles, captions, maps, tables, lists, and line drawings, this book covers geology, water and soil, atmosphere and climate, plants and animals. The writing is simple and clear, but the science is not oversimplified.

The Nature of North America is full of "gee

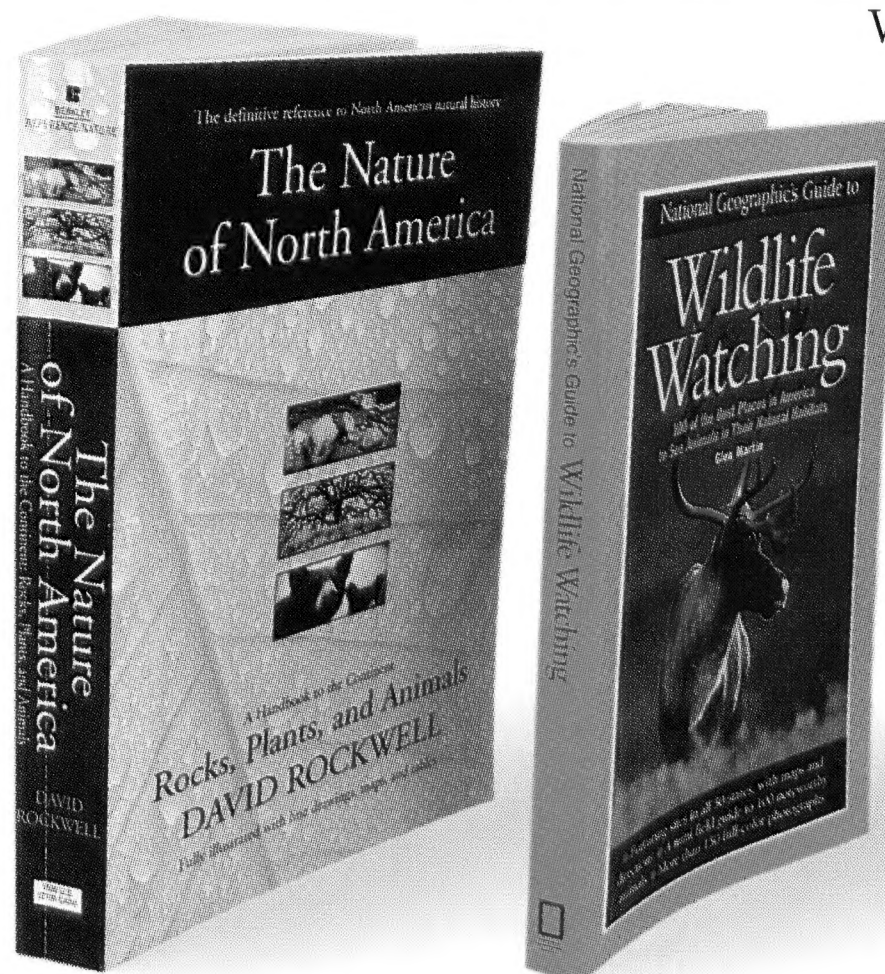
whiz" facts and figures. There is something on every page that I want to read aloud to whoever is nearby. Did you know that there is a crater some 85 miles in diameter in the Chesapeake Bay, the result of a huge meteorite that fell to Earth about 35 million years ago? How about that the size of the largest hailstone in the U.S. was 17.5 inches in circumference? Or that the total weight of salamanders in northeastern forests is twice that of birds at the birds' peak breeding season?

There are fascinating short stories, too, with titles like "Plants that run and hide" and "A natural arms race: bats and their prey" and "Sometimes she who hesitates has the advantage." One of my favorites is about the extinct Rocky Mountain grasshopper, swarms of which are preserved in the ice of Grasshopper Glacier in Montana's Beartooth Mountains. When the ice melts, birds and fish eat the grasshopper remains. There's something piquant about an extinct species still feeding extant species.

Whatever your special natural history interest, you'll find lots to savor in this remarkable volume. A copy to browse through in the car is a must for any road trip: It will enlighten and entertain in any terrain.

—Susan Lumpkin

Both books are available at the National Zoo Bookstore.



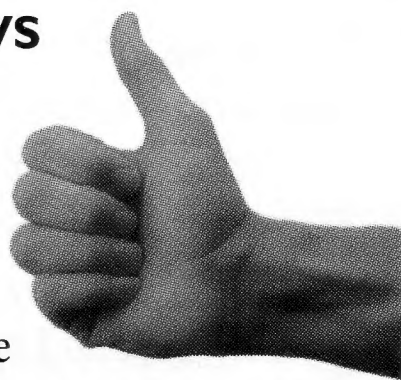
BIO- ALMANAC

GOOD NEWS

Need an injection of optimism amid the doom and gloom in the environmental forecast? Look no further than Maryland, the Old Line State. Although the official state bird, the Baltimore oriole (*Icterus galbula*), is in decline—and increasing numbers of the state fish, the rockfish or striped bass (*Morone saxatilis*), are eating up the state crustacean, the Maryland blue crab (*Callinectes sapidus*)—at least our national symbol, the bald eagle, is thriving along the Chesapeake Bay and other major waterways in Maryland.

Adult bald eagle (*Haliaeetus leucocephalus*) pairs nest high up in mature trees near rivers and bays, where females incubate one to three eggs for about 35 days beginning between January and March. Biologists estimate that well over 1,000 eagles—the highest number reported since annual surveys began in 1979—wintered in Maryland, based on one-day surveys at the three main bald eagle wintering sites: Blackwater National Wildlife Refuge, Aberdeen Proving Ground, and along the Susquehanna River.

University of Maryland at College Park sports fans also have reason for cheer: Populations of the official state reptile—and University of Maryland mascot—the diamondback terrapin (*Malaclemys terrapin*), have recovered after nearly going extinct due to demand for terrapin soup in the



1800s and early 1900s.

So raise a glass and sing along:
*But lo! there surges forth a shriek.
From hill to fill, from creek to creek—
Potomac calls to Chesapeake,
Maryland! My Maryland!*

—from the Environmental News Service and Maryland State Archives

BAD NEWS

Sadly, dreams of butterfly migrations may be flitting away on a wing and a prayer. As many as 22 million monarch butterflies in the Mexican state of Michoacán apparently died from the cold weather this past winter. More than 200 million monarch butterflies (*Danaus plexippus*) travel thousands of miles each year between winter shelter in central Mexico—where the insects reproduce and wait out the cold months, eating nothing—and summer habitat in the eastern United States and Canada. This striking orange and black insect (which is yellow



and black during its larval caterpillar stage) may be caught between the proverbial rock and a hard place. Aerial photographs taken over the last three decades reveal the gradual

disappearance of 44 percent of the monarch's unique balsam fir winter habitat in Mexico. Meanwhile, to the north, the International Fund for Animal Welfare in Canada is reporting that the monarch caterpillar's staple summer diet of milkweed (*Asclepias* spp.)—the source

of its continuing toxic distastefulness even after morphing into a nectar-feeding butterfly—is being cleared away by farmers and gardeners who see the plant as a weed. The monarch butterfly, in case you were wondering, is the state insect of Delaware and West Virginia.

—from Reuters (3/7/01 and 3/10/01)

THE HORN OF A HOAX

A “new” species of ungulate collected by scientists in Vietnam in 1993 turns out to be a fraud, according to genetic analysis done by Alexandre Hassanin of the Pierre and Marie Curie University in Paris. The animal in question is none other than your garden-variety domestic cow (*Bos taurus*), whose horns apparently had been heated, squeezed, and then bent. The culprits, local villagers, perhaps were simply trying to recreate a mythical curved-horn, snake-eating cow from Khmer folk legend, *khting sipuoh*—which eager taxonomists mistook for a real creature and christened *Pseudonovibos spiralis*. The incident recalls an earlier osteological sham: that of Piltdown Man. Supposedly a missing link between our ape ancestors and modern hominids, the 1912 fossil discovery from Sussex, England, was finally revealed in 1953 to be a filed-down jawbone of an orang utan (*Pongo pygmaeus*) attached to the cranium of a modern *Homo sapiens*.

—from New Scientist (2/19/01)

WHAT'S IN A NAME?

Throughout history, ravens (*Corvus corax*) have been regarded as harbingers of misfortune and death. The Ravens certainly epitomized Giant-killers on January 28, when Baltimore

overwhelmed New York 34-7 to win Super Bowl XXXV. Their namesakes have long safeguarded the Tower of London, and the Baltimore Ravens' defensive unit fittingly squelched the New York Giant offense from kickoff to the final whistle.

The Baltimore franchise had been dubbed The Ravens in reference, of course, to the famous poem by Edgar Allan Poe. Pride of Charm City, Poe penned “The Raven” in 1844 while actually living in Philadelphia. He chose the raven as a symbol of ill omen casting a melancholy tone upon the death of the narrator's love, Lenore. “The death...of a beautiful woman,” Poe later wrote, “is, unquestionably, the most poetical topic in the world.” Incidentally, Poe's wife Virginia would die of tuberculosis two years after “The Raven” was published, and Poe himself perished mysteriously in Baltimore two years after that. An ominous fowl indeed.

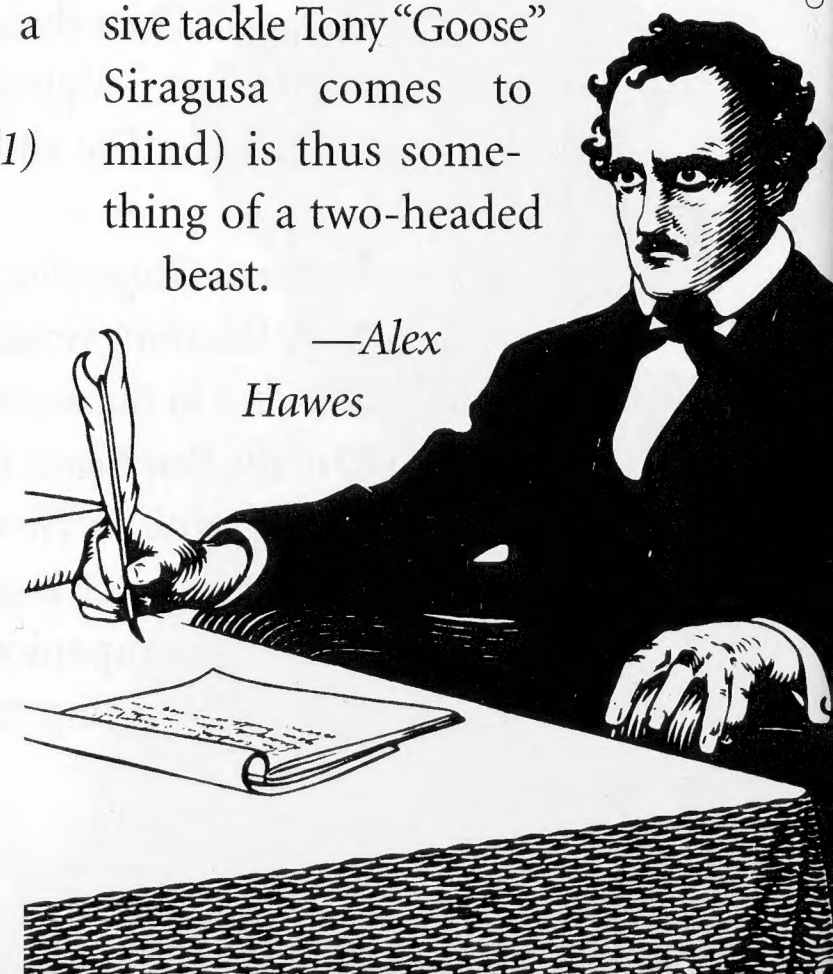
The word “raven,” both the bird and the color, is believed to descend from the Old English, *hraefn*, or Old Norse, *hrafn*. However the verb, “raven”—to devour or to plunder—as well as the adjective, “ravenous,” and nouns “ravin,” “rapacity,” and “rapaciousness” have an entirely distinct derivation. These words all come from the Latin word, *rapere*, meaning “to seize.” A ravenous Raven (340-pound defensive tackle Tony “Goose” Siragusa comes to mind) is thus something of a two-headed beast.

—Alex Hawes



ALEX HAWES/FONZ

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